



## Planning Commission Meeting Agenda

August 8, 2023  
5:30 PM – Regular Meeting  
Council Chambers  
400 N. Douty St.

Planning Commissioners will meet in-person in the Council Chambers. The meeting will also be live streamed on the City's website: <http://livestream.hanford.city/>

### ROLL CALL:

### INVOCATION:

### FLAG SALUTE:

### PUBLIC COMMENT:

*This is the time for citizens to comment on subject matters not on the agenda and that are within the jurisdiction of the Commission. This is also the public's opportunity to request an item from the Consent Calendar be pulled for discussion purposes or to comment on any item on the agenda. Comments related to Public Hearing items will be heard at the time the item is discussed. A maximum of three minutes is allowed for each speaker. Please begin your comments by stating your name and providing your city of residence.*

### CONSENT CALENDAR:

*Consent Calendar items are considered routine and will be enacted in one motion. There will be no separate discussion of these matters unless a request is made and then the item will be removed from the Consent Calendar to be discussed and voted upon by a separate motion.*

- A. Community Development: **Approval of the Minutes of the July 25, 2023 Meeting**

### PUBLIC HEARING:

- A. Community Development: General Plan Amendment No. 2022-01: a request to change the general plan designation from Highway Commercial to Service Commercial and High-Density Residential on approximately 39.16 acres.

Rezone No. 2022-01: a request to change the zoning on 39.16 acres from C-H Highway Commercial to C-S Service Commercial and R-H High-Density Residential with a Planned Unit Development overlay.

Planned Unit Development No. 2022-01: a request to allow blended zoning for a master

planned medical and mixed-use development, including the future construction of 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements.

Mitigated Negative Declaration No. 2023-93: a request to certify that the project will have a less than significant impact with the incorporation of mitigation measures.

The project is located between 11<sup>th</sup> and 12<sup>th</sup> Avenues along Glendale Drive, north of Highway 198 (APN 011-060-007, 011-060-008, 012-290-042, and 012-290-054).

## **DIRECTOR'S COMMENTS:**

## **COMMISSIONERS' ITEMS OF INTEREST:**

*At this time, any Commissioner may ask a question for clarification of matters within the Planning Commission's jurisdiction, make an announcement, or report briefly on activities in their role as a Planning Commissioner. In addition, subject to the Planning Commissioner's Handbook, Commissioners may request staff to report back to the Planning Commission at a subsequent meeting concerning any matter within the Commissioner's jurisdiction (GC 54954.2).*

## **ADJOURNMENT:**

*Materials related to an item on this Agenda submitted to the Planning Commission after distribution of the agenda packet are available to public inspection in the Planning Division Office located at 317 N. Douty Street, Hanford, California 93230, during normal business hours. Such documents are also available at the city's website, [www.cityofhanfordca.com](http://www.cityofhanfordca.com) subject to staff's ability to post documents before the meeting. If you need a disability-related modification or accommodation, including auxiliary aids or services, to participate in this meeting, please contact the Planning Division's office, 559-585-2580, 317 N. Douty Street, Hanford, California 93230, at least 2 days prior to the meeting {28 CFR 35.102.35.104 ADA Title II} APPEALS: Any action of the Planning Commission, which is a final project decision, may be appealed to the City Council by the applicant or any adversely affected person. To file an appeal, an appeal application and filing fee of \$1,000.00 must be submitted to the Community Development Department, 317 N. Douty Street, Hanford, California, within ten (10) days following the date of the final decision of the Planning Commission.*

Materials related to an item on this Agenda submitted to the City Council after distribution of the agenda packet are available to public inspection in the City Clerk's Office located at 319 N. Douty Street, Hanford, California 93230, during normal business hours. Such agendas are also available at the city's website, [www.cityofhanfordca.com](http://www.cityofhanfordca.com) subject to staff's ability to post the agenda before the meeting.

If you need a disability-related modification or accommodation, including auxiliary aids or services, to participate in this meeting, please contact the City Clerk's office, 559-585-2515, 319 N. Douty Street, Hanford, California 93230, at least 2 days prior to the meeting {28 CFR 35.102.35.104 ADA Title II}





## AGENDA STAFF REPORT

|                               |                                         |
|-------------------------------|-----------------------------------------|
| <b>MEETING DATE:</b> 8/8/2023 | <b>AGENDA SECTION:</b> CONSENT CALENDAR |
|-------------------------------|-----------------------------------------|

**SUBJECT:**

Approval of the Minutes of the July 25, 2023 Meeting

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**RECOMMENDATION:**

Approve the minutes of the July 25, 2023 meeting.

**ATTACHMENTS:**

1. 07-25-23 Minutes



**Planning Commission Regular Meeting  
Minutes**

**July 25, 2023 5:30 PM  
Council Chambers  
400 N. Douty St.**

**ROLL CALL:**

| <b>Present:</b>                                                                                                                                                                                                       | <b>Absent:</b>            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Planning Commissioner - Alternate Garry Curtis<br>Planning Commissioner Dennis Ham<br>Planning Commissioner Jacob Sanchez<br>Planning Commissioner Richard Douglas<br>Vice-Chair Planning Commissioner Gunther Norris | Chair Commissioner Devine |

**INVOCATION:**

Pastor Bud Haskell, Grace Bible Church

**FLAG SALUTE:**

Commissioner CURTIS led the flag salute.

**PUBLIC COMMENT:**

*This is the time for citizens to comment on subject matters not on the agenda and that are within the jurisdiction of the Commission. This is also the public's opportunity to request an item from the Consent Calendar be pulled for discussion purposes or to comment on any item on the agenda. Comments related to Public Hearing items will be heard at the time the item is discussed. A maximum of three minutes is allowed for each speaker. Please begin your comments by stating your name and providing your city of residence.*

None.

**CONSENT CALENDAR:**

*Consent Calendar items are considered routine and will be enacted in one motion. There will be no separate discussion of these matters unless a request is made and then the item will be removed from the Consent Calendar to be discussed and voted upon by a separate motion.*

**A. Community Development: Minutes of the June 27, 2023 Meeting**

Motion to approve the minutes of the June 27, 2023 meeting.

**RESULT:** (UNANIMOUS)  
**MOVER:** DOUGLAS  
**SECONDER:** CURTIS  
**AYES:** DOUGLAS, CURTIS, HAM, SANCHEZ, NORRIS

|          |        |
|----------|--------|
| ABSTAIN: | NONE   |
| ABSENCE: | DEVINE |

## PUBLIC HEARING:

- A. Community Development: Conditional Use Permit No. 0007-23, a request to allow a Type 40 ABC liquor license for the on-site sale of beer within Tilted Athletic Facility in the MX-C Corridor Mixed Use zone district. The project is located at 325 N. 11<sup>th</sup> Avenue. (APN 012-013-009)

Vice-Chair NORRIS opened the public hearing and called for the staff report. Associate Planner Manha presented the staff report, recommended approval, and invited questions of staff.

Commissioner HAM asked if the applicants would be selling alcohol both on site and off site. The applicant replied that alcohol will only be sold on site.

Vice-Chair NORRIS opened Public Comment. There being none, he called for a motion.

Motion to adopt Resolution No. 2023-17, approving Conditional Use Permit No. 0007-23.

|                  |                                       |
|------------------|---------------------------------------|
| <b>RESULT:</b>   | <b>(UNANIMOUS)</b>                    |
| <b>MOVER:</b>    | CURTIS                                |
| <b>SECONDER:</b> | DOUGLAS                               |
| <b>AYES:</b>     | CURTIS, DOUGLAS, HAM, SANCHEZ, NORRIS |

- B. Community Development: **Variance No. 0005-23:** A request to deviate from the standards of the Hanford Municipal Code Section 17.10.070 E, in order to reduce the street-side setback for an irregular corner lot in the R-L-5 Low-Density Residential zone district from 10 feet to seven feet. The project is located at 1455 S. Horizon Circle (APN 011-054-036).

Vice-Chair NORRIS called for the staff report.

Senior Planner MYERS stated that Variances No. 0005-23, 0006-23, 0007-23, 2023-08, and 2023-11 would be combined into one presentation, and each would be voted on separately. She introduced Planning Intern Annie Jones, who would give the presentation.

Ms. Jones presented the staff report and recommended approval of the applications. Ms. Myers invited questions of staff.

Commissioner HAM stated that he had visited the sites in question yesterday, and they were all in various stages of construction. He asked why these issues were not discovered during plan review. Senior Planner Myers replied that they were caught during plan review, and no building permits have been issued for these sites. Commissioner HAM then asked if they are doing work without permits. Director Waters replied that it would depend on what type of construction was taking place; and without the details, he could not answer that clearly. Staff's recommendation would be that they conform with waiting until the permits have been issued to begin.

Vice-Chair NORRIS opened Public Comment. There being none, he called for a motion.

Motion to adopt Resolution No. 2023-16, approving Variance No. 0005-23.

|                  |                                       |
|------------------|---------------------------------------|
| <b>RESULT:</b>   | <b>(UNANIMOUS)</b>                    |
| <b>MOVER:</b>    | SANCHEZ                               |
| <b>SECONDER:</b> | CURTIS                                |
| <b>AYES:</b>     | SANCHEZ, CURTIS, HAM, DOUGLAS, NORRIS |
| <b>ABSTAIN;</b>  | NONE                                  |
| <b>ABSENT:</b>   | DEVINE                                |

- C. Community Development: **Variance No. 0006-23:** A request to deviate from the standards of the Hanford Municipal Code Section 17.10.070 E, in order to reduce the

street-side setback for an irregular corner lot in the R-L-5 Low-Density Residential zone district from 10 feet to seven feet. The project is located at 1450 S. Horizon Circle (APN 011-054-037).

Vice-Chair NORRIS called for a motion..

Motion to adopt Resolution No. 2023-18, approving Variance 0006-23.

**RESULT:** (UNANIMOUS)  
**MOVER:** DOUGLAS  
**SECONDER:** CURTIS  
**AYES:** DOUGLAS, CURTIS, HAM, SANCHEZ, NORRIS  
**ABSTAIN:** NONE  
**ABSENT:** DEVINE

- D. Community Development: **Variance No. 0007-23:** A request to deviate from the standards of the Hanford Municipal Code Section 17.10.070 E, in order to reduce the street-side setback for an irregular corner lot in the R-L-5 Low-Density Residential zone district from 10 feet to seven feet. The project is located at 1471 S. Orbit Circle (APN 011-054-042).

Vice-Chair NORRIS called for a motion.

Motion to adopt Resolution No. 2023-19, approving Variance No. 0007-23.

**RESULT:** (UNANIMOUS)  
**MOVER:** HAM  
**SECONDER:** CURTIS  
**AYES:** HAM, CURTIS, DOUGLAS, SANCHEZ, NORRIS  
**ABSTAIN:** NONE  
**ABSENT:** DEVINE

- E. Community Development: **Variance No. 2023-08:** A request to deviate from the standards of the Hanford Municipal Code Section 17.10.070 E, in order to reduce the street-side setback for an irregular corner lot in the R-L-5 Low-Density Residential zone district from 10 feet to seven feet. The project is located at 1468 S. Orbit Circle (APN 011-054-043).

Vice-Chair NORRIS called for a motion.

Motion to adopt Resolution No. 2023-20, approving Variance No. 2023-08.

**RESULT:** (UNANIMOUS)  
**MOVER:** SANCHEZ  
**SECONDER:** HAM  
**AYES:** SANCHEZ, HAM, CURTIS, DOUGLAS, NORRIS  
**ABSTAIN:** NONE  
**ABSENT:** DEVINE

- F. Community Development: **Variance No. 2023-11:** A request to deviate from the standards of the Hanford Municipal Code Section 17.10.070 E, in order to reduce the street-side setback for an irregular corner lot in the R-L-5 Low-Density Residential zone district from 10 feet to seven feet. The project is located at 1473 S. Tropics Place (APN 011-054-030).

Vice-Chair NORRIS called for a motion.

Motion to adopt Resolution No. 2023-21, approving Variance No. 023-11.

**RESULT:** (UNANIMOUS)  
**MOVER:** CURTIS  
**SECONDER:** DOUGLAS

|                 |                                       |
|-----------------|---------------------------------------|
| <b>AYES:</b>    | CURTIS, DOUGLAS, HAM, SANCHEZ, NORRIS |
| <b>ABSTAIN:</b> | NONE                                  |
| <b>ABSENT:</b>  | DEVINE                                |

- G. Community Development: Variance No. 2023-12: A request to deviate from the standards of the Hanford Municipal Code Section 17.10.070 E, in order to reduce the street-side setback for an irregular corner lot in the R-L-5 Low-Density Residential zone district from 10 feet to seven feet. The project is located at 1476 S. Tropics Place (APN 011-054-031).

Vice-Chair NORRIS called for a motion.

Motion to adopt Resolution 2023-22, approving Variance No. 2023-12.

|                  |                                       |
|------------------|---------------------------------------|
| <b>RESULT:</b>   | <b>(UNANIMOUS)</b>                    |
| <b>MOVER:</b>    | HAM                                   |
| <b>SECONDER:</b> | SANCHEZ                               |
| <b>AYES:</b>     | HAM, SANCHEZ, CURTIS, DOUGLAS, NORRIS |
| <b>ABSTAIN:</b>  | NONE                                  |
| <b>ABSENT:</b>   | DEVINE                                |

#### **DIRECTOR'S COMMENTS:**

Director Waters had no comments.

Commissioner CURTIS asked what projects might be coming before the Commission in the next few weeks. Director Waters mentioned possible annexations, rezone, and a large master plan.

#### **COMMISSIONERS' ITEMS OF INTEREST:**

*At this time, any Commissioner may ask a question for clarification of matters within the Planning Commission's jurisdiction, make an announcement, or report briefly on activities in their role as a Planning Commissioner. In addition, subject to the Planning Commissioner's Handbook, Commissioners may request staff to report back to the Planning Commission at a subsequent meeting concerning any matter within the Commissioner's jurisdiction (GC 54954.2).*

Commissioner HAM stated that at the last City Council meeting, there was a question about the housing shortage. He asked how the housing requirements are determined. Director Waters replied that the state and county assign the numbers to the city by type, and the city has to prove that we are meeting the criteria by type.

#### **ADJOURNMENT:**

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Vice-Chair NORRIS adjourned the meeting at 5:58 p.m.

Respectfully submitted,

Diana Black  
Recording Secretary



**CITY OF HANFORD PLANNING COMMISSION  
STAFF REPORT**

**MEETING DATE:** Tuesday, August 8, 2023

**PROJECT:** General Plan Amendment No. 2022-01: a request to change the general plan designation from Highway Commercial to Service Commercial and High-Density Residential on approximately 39.16 acres.

Rezone No. 2022-01: a request to change the zoning on 39.16 acres from C-H Highway Commercial to C-S Service Commercial and R-H High-Density Residential with a Planned Unit Development overlay.

Planned Unit Development No. 2022-01: a request to allow blended zoning for a master planned medical and mixed-use development, including the future construction of 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements.

Mitigated Negative Declaration No. 2023-93: a request to certify that the project will have a less than significant impact with the incorporation of mitigation measures.

**Location:** The project is located between 11<sup>th</sup> and 12<sup>th</sup> Avenues along Glendale Drive, north of Highway 198 (APN 011-060-007, 011-060-008, 012-290-042, and 012-290-054).

**PLANNER:** Gabrielle Myers, Senior Planner

|                             |
|-----------------------------|
| <b>STAFF RECOMMENDATION</b> |
|-----------------------------|

1. Recommend certification of Mitigated Negative Declaration No. 2023-93 for the project to the City Council.
2. Adopt Resolution No. 2023-23, recommending approval of General Plan Amendment No. 2022-01 to the City Council.
3. Adopt Resolution No. 2023-24, recommending approval Rezone No. 2022-01 to the City Council.
4. Adopt Resolution No. 2023-25, recommending approval of Planned Unit Development No. 2022-01 to the City Council.

|                           |
|---------------------------|
| <b>RECOMMENDED MOTION</b> |
|---------------------------|

1. I move to recommend certification of Mitigated Negative Declaration No. 2023-93 for the project to the City Council.

2. I move to adopt Resolution No. 2023-23, recommending approval of General Plan Amendment No. 2022-01 to the City Council.
3. I move to adopt Resolution No. 2023-24, recommending approval Rezone No. 2022-01 to the City Council.
4. I move to adopt Resolution No. 2023-25, recommending approval of Planned Unit Development No. 2022-01 to the City Council.

## PROJECT DESCRIPTION

The project is a request to develop Hanford Place, a medical and mixed-use development, totaling 39.16 acres. The Hanford Place Master Plan includes the future construction of 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements, as shown in the Hanford Place Master Plan - **Attachment 1**.

### Location

The project is located between 11<sup>th</sup> and 12<sup>th</sup> Avenues along Glendale Drive, north of Highway 198 (APN 011-060-007, 011-060-008, 012-290-042, and 012-290-054), as shown in Figure 1.



Figure 1: Project Location



LSA

LEGEND

 Project Site

FIGURE 2



0 250 500  
FEET

SOURCE: Google Aerial Imagery (2020).

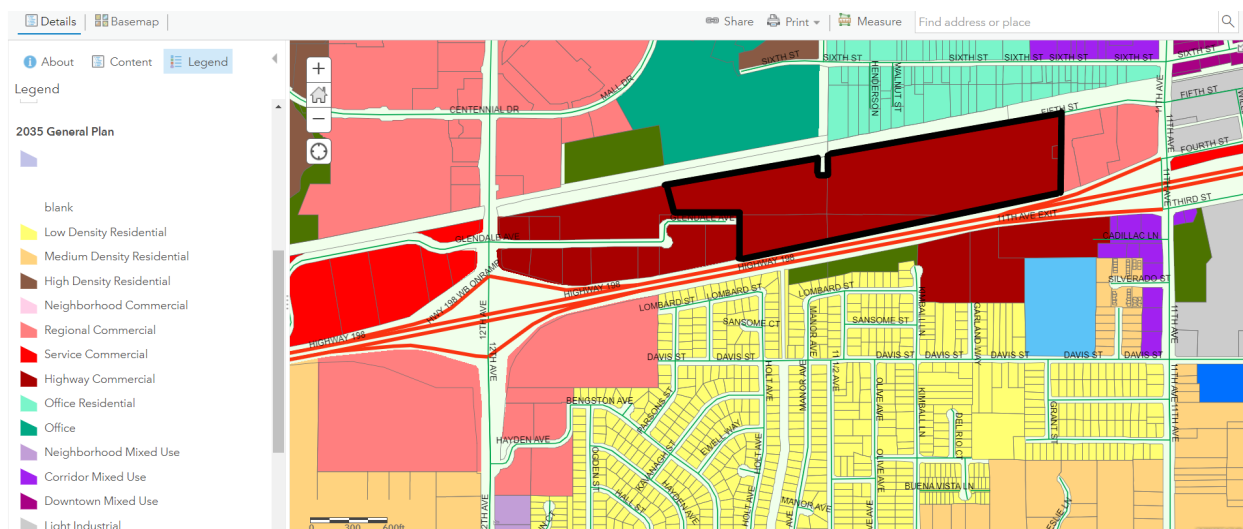
Hanford Place Project  
Hanford, Kings County, California  
Project Location

## General Plan Designation

The project site is designated as Highway Commercial by the General Plan, see Figure 2. According to General Plan Policy L56, the purpose of the Highway Commercial Land Use Designation is to provide areas for commercial establishments that offer accommodations, supplies, services, or recreational opportunities primarily to the traveling public. According to Policy L57, typical uses in the Highway Commercial Land Use Designation include businesses that support the recreation and tourism industry and prevent the intrusion of incompatible, non-tourist related uses which would be overly disruptive or would directly compete with shopping areas of nearby communities. Typical uses include full-service hotels, motels, eating establishments, tourist-oriented retail goods, entertainment, and services, automobile related service and repair, and car washes.

As proposed, the project is incompatible with the present land use designation, since it proposes the construction of a mixed-use medical development, which is not designed to provide services primarily to the traveling public. The project includes a request to change the land use designation from Highway Commercial to a combination of Service Commercial and High-Density Residential.

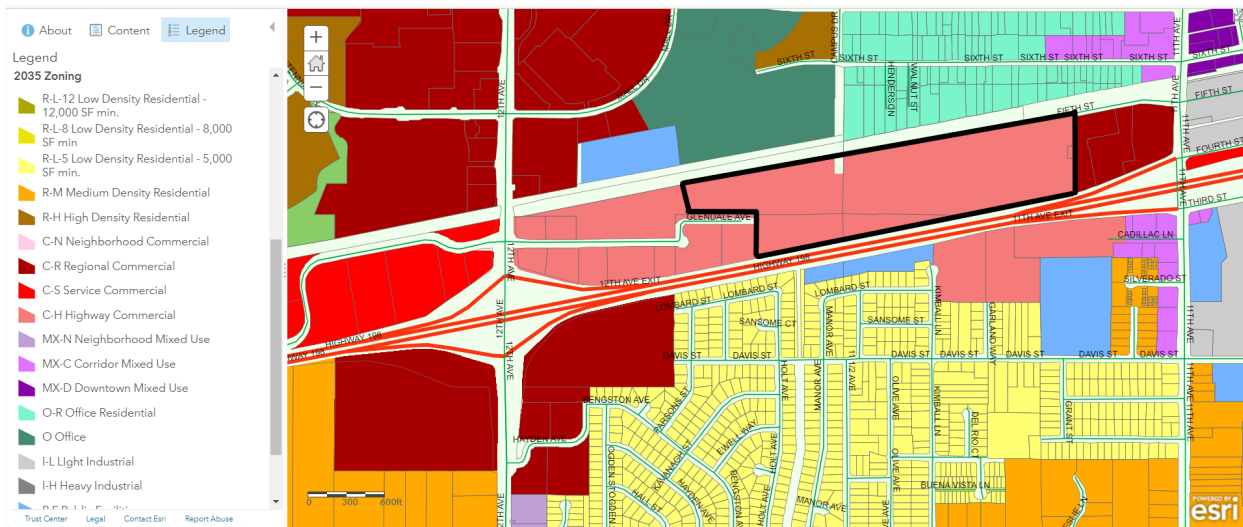
**Figure 2: General Plan Designation (outlined in bold)  
Highway Commercial**



## Zoning

The project site is zoned C-H Highway Commercial, in accordance with the General Plan Designation, Highway Commercial. See Figure 3. The project is incompatible with the present zoning, since it proposes land uses that are not permitted in the C-H Highway Commercial zone district, including medical and professional offices, urgent care clinics, a nursing college or other satellite campus, and multi-family residential. The project includes a request to change the zoning on the property from C-H Highway Commercial to a combination of C-S Service Commercial and R-H Highway Commercial.

**Figure 3: Zoning (outlined in bold)  
C-H Highway Commercial**



**Figure 4: Zone Use Table  
Education, Religious, and Assembly Uses**

| Commercial, Office, and Industrial Zone Use Table                                   |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------|-----|-----|-----|-----------------|------|------|-----------------------------|---|-----|-----|-------------|----|----|------------------------------------------------------|
| P = Use Is Permitted by Right    C = Use Requires Conditional Use Permit            |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| A = Use Requires Administrative Use Permit    T = Use Requires Temporary Use Permit |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| Blank = Use Is Not Allowed                                                          |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| Land Uses                                                                           |                                                                    | Commercial Zones |     |     |     | Mixed Use Zones |      |      | Industrial and Office Zones |   |     |     | Other Zones |    |    | Specific Land Use Standards (See Identified Section) |
|                                                                                     |                                                                    | C-N              | C-R | C-S | C-H | MX-N            | MX-C | MX-D | O-R                         | O | I-L | I-H | AP          | PF | CO |                                                      |
| C                                                                                   | Education, Religious and Assembly Uses                             |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| C5                                                                                  | College or university, public or private                           |                  | C   | C   |     |                 | C    | C    |                             |   |     |     |             | P  |    |                                                      |
| C13                                                                                 | School; charter, trade, vocational, art, business, or professional |                  | C   | P   |     |                 | C    | C    | C                           | C | C   |     |             | P  |    |                                                      |

**Figure 5: Zone Use Table  
Office and Medical Uses**

| <b>Commercial, Office, and Industrial Zone Use Table</b><br>P = Use Is Permitted by Right    C = Use Requires Conditional Use Permit<br>A = Use Requires Administrative Use Permit    T = Use Requires Temporary Use Permit<br>Blank = Use Is Not Allowed |                                            |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------|-----|-----|-----|-----------------|------|------|-----------------------------|---|-----|-----|-------------|----|----|------------------------------------------------------|
| Land Uses                                                                                                                                                                                                                                                 |                                            | Commercial Zones |     |     |     | Mixed Use Zones |      |      | Industrial and Office Zones |   |     |     | Other Zones |    |    | Specific Land Use Standards (See Identified Section) |
|                                                                                                                                                                                                                                                           |                                            | C-N              | C-R | C-S | C-H | MX-N            | MX-C | MX-D | O-R                         | O | I-L | I-H | AP          | PF | CO |                                                      |
| <b>E</b>                                                                                                                                                                                                                                                  | <b>Office and Medical Uses</b>             |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| E4                                                                                                                                                                                                                                                        | Laboratory; general, medical or dental     |                  | C   | P   | C   |                 | P    | C    |                             | P | C   |     |             |    |    |                                                      |
| E5                                                                                                                                                                                                                                                        | Hospital, general or psychiatric           |                  |     |     |     |                 |      |      |                             | P |     |     |             | P  |    |                                                      |
| E6                                                                                                                                                                                                                                                        | Office; medical, dental, or optometry      |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Under 2,000 sq. ft.                        | P                | P   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | 2,000 – 6,000 sq. ft.                      | P                | C   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Over 6,000 sq. ft.                         | P                |     | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
| E7                                                                                                                                                                                                                                                        | Office; professional or commercial         |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Under 2,000 sq. ft.                        | P                | P   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | 2,000 – 6,000 sq. ft.                      | P                | C   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Over 6,000 sq. ft.                         | P                |     | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
| E8                                                                                                                                                                                                                                                        | Pharmacy                                   | P                | P   | P   |     | P               | P    | P    |                             | P |     |     |             |    |    |                                                      |
| E9                                                                                                                                                                                                                                                        | Urgent care center or other walk-in clinic | P                | C   | C   |     | P               | P    | P    |                             | P |     |     |             |    |    |                                                      |



**Figure 6: Zone Use Table  
Residential Uses**

| <b>Commercial, Office, and Industrial Zone Use Table</b><br>P = Use Is Permitted by Right    C = Use Requires Conditional Use Permit<br>A = Use Requires Administrative Use Permit    T = Use Requires Temporary Use Permit<br>Blank = Use Is Not Allowed |                                                                       |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------|-----|-----|-----|-----------------|------|------|-----------------------------|---|-----|-----|-------------|----|----|---------------------------------------------------------|
| Land Uses                                                                                                                                                                                                                                                 |                                                                       | Commercial Zones |     |     |     | Mixed Use Zones |      |      | Industrial and Office Zones |   |     |     | Other Zones |    |    | Specific Land Use Standards<br>(See Identified Section) |
|                                                                                                                                                                                                                                                           |                                                                       | C-N              | C-R | C-S | C-H | MX-N            | MX-C | MX-D | O-R                         | O | I-L | I-H | AP          | PF | CO |                                                         |
| <b>H</b>                                                                                                                                                                                                                                                  | <b>Residential Uses</b>                                               |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                         |
| H1                                                                                                                                                                                                                                                        | Assisted living, skilled nursing, or hospice facility                 |                  |     |     |     | C               | C    | C    | C                           |   |     |     |             |    |    |                                                         |
| H6                                                                                                                                                                                                                                                        | Hotel or motel                                                        |                  | C   | C   | P   |                 | P    | P    |                             |   |     |     |             |    |    |                                                         |
| H7                                                                                                                                                                                                                                                        | Live/work facility                                                    |                  |     | P   |     | P               | P    | P    | P                           |   |     |     |             |    |    |                                                         |
| H8                                                                                                                                                                                                                                                        | Mobile home park                                                      |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    | 17.60.100                                               |
| H9                                                                                                                                                                                                                                                        | Multifamily dwelling, 2 units per building (duplex)                   |                  |     |     |     | P               | P    | P    | P                           |   |     |     |             |    |    |                                                         |
| H10                                                                                                                                                                                                                                                       | Multifamily dwelling, 3 or 4 units per building (triplex or fourplex) |                  |     |     |     | P               | P    | P    | C                           |   |     |     |             |    |    |                                                         |
| H11                                                                                                                                                                                                                                                       | Multifamily dwelling, 5 or more units per building                    |                  |     |     |     | P               | P    | P    |                             |   |     |     |             |    |    |                                                         |

### Required Entitlements

As presented above, the project is inconsistent with the present land use and zoning designation. As such, the project involves a general plan amendment, rezone, and planned unit development/master plan. Future development will require site plan reviews for physical development.

### **General Plan Amendment No. 2022-01**

A General Plan Amendment is required for the project, in order to change the General Plan designation of the subject site from Highway Commercial to a combination of Service Commercial and High-Density Residential.

### **Rezone 2022-01**

A rezone is required for the project, in order to change the zoning from C-H Highway Commercial to a combination of C-S Service Commercial and R-H High-Density Residential with a Planned Unit Development overlay.

### **Planned Unit Development No. 2022-01/Master Plan**

As described above, the project involves a request to allow a mixed-use medical development, spanning 39.16 acres. A planned unit development is required in order to establish project-specific design criteria, allow a blending of uses regardless of zoning, and allow cross-access, shared parking, shared landscaping, and shared lighting.

### Surrounding Uses

As referenced in the table below, the project site is surrounded by commercial uses to the south and east, vacant land to the west, and a parking lot to the north. The properties to the north and east are planned and zoned for mixed use development and the properties south and west are planned and zoned for service commercial.

| Direction | Existing Land Use                                                    | General Plan Designation                                | Zone District                                                             |
|-----------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|
| North     | Railroad; Adventist Health Medical Center; single-family residential | Office; Office Residential                              | O Office; O-R Office Residential                                          |
| South     | CA-198; car dealership; basin; single-family residential             | Highway Commercial, Open Space, Low-Density Residential | C-H Highway Commercial, PF Public Facility, R-L-5 Low-Density Residential |
| East      | Integrate shopping center – grocery, retail, gym, restaurant         | Regional Commercial                                     | C-R Regional Commercial                                                   |
| West      | Veterinary hospital, mini-storage, California Highway Patrol, hotel  | Highway Commercial                                      | C-H Highway Commercial                                                    |

### **Access and Circulation**

Vehicular access to the site is proposed to be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right-of-way. The proposed project would also construct a roundabout, which will also be dedicated as public right-of-way and would be constructed to Caltrans or City-approved standards. As part of the project, Glendale Avenue would be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle will be removed, and Glendale Avenue will be realigned using speed-specific design curves. Any new portions of Glendale Avenue will be dedicated as public right-of-way and any portion of existing right of way not used would be abandoned. Fifth Street would be extended starting at the existing alignment before realigning to the roundabout. In addition, the proposed project proposes to provide 1,466 parking spaces throughout the project site.

### **Utilities**

Utilities required to serve the proposed project include water, sanitary sewer, storm water drainage, electricity, natural gas, and telecommunications infrastructure. Water service, sewage disposal, and refuse collection will be provided by the City. In addition, all City utilities (i.e., water, sewer, and storm drain) would be constructed within the proposed right-of-way. Storm drainage is proposed to be collected by an underground conveyance system and delivered to the onsite bio infiltration basin. The basin would be privately held by the owners and would collect both the proposed project and the City right-of-way. All storm drain facilities will be required to be designed to City standards.

The proposed project also proposes to convert the Peoples Ditch to a 66-inch-diameter below-ground pipeline where the ditch currently exists and would terminate approximately 20 feet short of the existing pipeline that runs under SR-198. The depth of the below-ground pipeline will be between two and six feet.

The proposed project will also require electrical, natural gas, telephone, and cable improvements. Electricity will be provided by Southern California Edison; natural gas will be provided by Southern California Gas; and telephone services will be provided by AT&T. The extent of work required for utilities and gas will be determined during final project design.

## **Construction**

The proposed project is proposed to be constructed in three phases and is anticipated to begin March 2024. Construction is anticipated to last approximately three years. The proposed project will comply with City standards, including the City's current building code, landscape standards, and lighting standards. In addition, the proposed project would be graded similar to other developments throughout the City.

## **PROJECT EVALUATION**

### **General Plan Amendment No. 2022-01**

General Plan Amendment No. 2022-01 is a request to change the land use designation from Highway Commercial to a combination of Service Commercial and High-Density Residential, due to incompatibility with the Hanford Place Master Plan and the existing Highway Commercial land use designation.

#### **3.5.4 Highway Commercial**

##### *Policy L56 Purpose of Highway Commercial Land Use Designation*

Establish the Highway Commercial land use designation to provide areas for commercial establishments that offer accommodations, supplies, services, or recreational opportunities primarily to the traveling public.

##### *Policy L57 Typical Uses in Highway Commercial Land Use Designation*

Define the uses allowed in the Highway Commercial land use designation to include businesses that support the recreation and tourism industry and to prevent the intrusion of incompatible, non-tourist related uses which would be overly disruptive or would directly compete with shopping areas of nearby communities. Typical uses include full-service hotels, motels, eating

establishments, tourist-oriented retail goods, entertainment, and services, automobile related service and repair, and car washes.

Analysis: The Hanford Place Master Plan proposes to develop a mixed-use medical complex with uses such as medical offices, clinics, psychiatric health facility, a hotel and conference center, nursing college, strip retail, a skilled nursing facility, memory care facility, assisted living, and multi-family residential. The uses proposed to be located within the Hanford Place Medical and Mixed-Use development are inconsistent with the uses typical of the Highway Commercial Land Use Development.

*Policy L58 Design of the Highway Commercial Land Use Designation*

Require that new development projects and major site reconfigurations in the Highway Commercial land use designation provide site layouts, landscaping, and screening so that the site appears aesthetically pleasing from the public street.

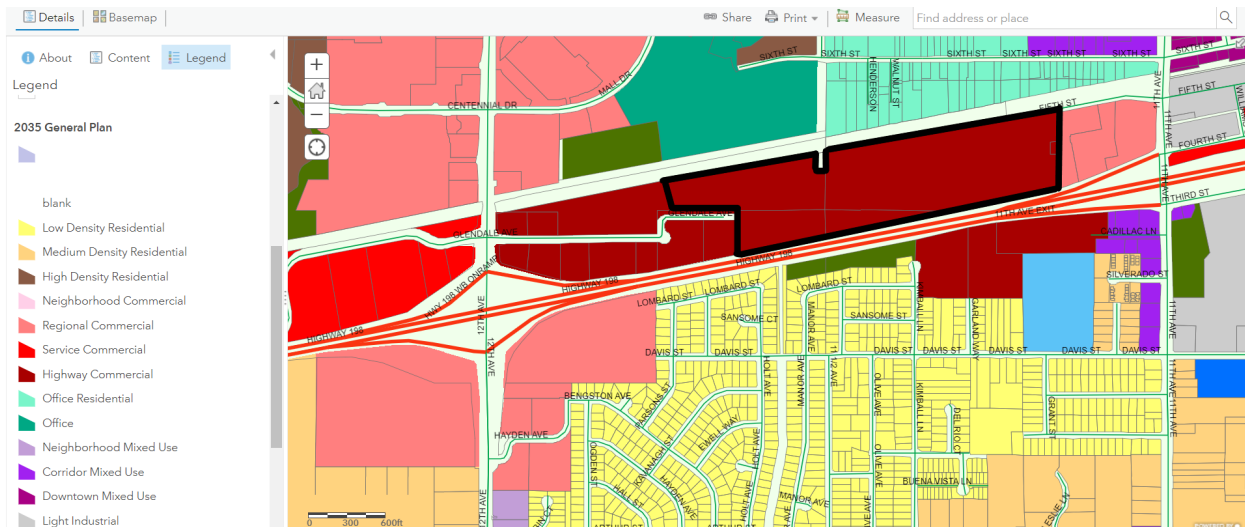
*Policy L59 Location and Size of Highway Commercial Land Use Designation*

Locate Highway Commercial land use designations in areas that have nearby access to Highway 198 or Highway 43.

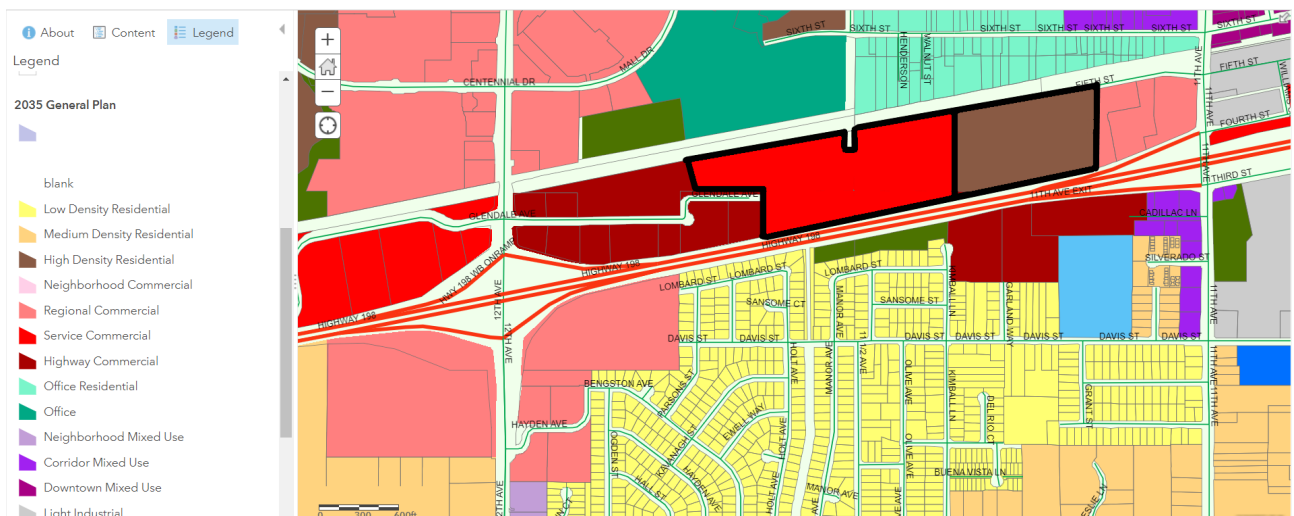
Analysis: As proposed, the project is incompatible with the present land use designation, since it proposes the construction of a mixed-use medical development, which is not designed to provide services primarily to the traveling public. General Plan Amendment No. 2022-01 proposes to change the land use designation from Highway Commercial to a combination of Service Commercial and High-Density Residential.



**Figure 7: Existing General Plan Designation  
Highway Commercial**



**Figure 8: Proposed General Plan Designation  
Service Commercial and High-Density Residential**



### 4.5.3 Service Commercial

#### *Policy L51 Purpose of Service Commercial Land Use Designation*

Establish the Service Commercial land use designation to provide for establishments that engage in servicing equipment, materials, products and related sales and travel conveniences, but which do not require the manufacturing, assembly, packaging or processing of articles or merchandise for distribution.

#### *Policy L52 Typical Uses in Service Commercial Land Use Designation*

Define the uses allowed in the Service Commercial land use designation to include a broad range of commercial activities such as businesses which have both retail and service components. Among these are uses such as vehicle sales and service; auto rental and equipment rental; motels; restaurants (including fast food); service stations; car washes; building material supply; warehousing; wholesale trade; contractors, suppliers, small equipment yards; and other similar uses.

Analysis: The development proposed within Hanford Place does not require the manufacturing, assembly, packaging, or processing of articles of merchandise for distribution. The uses proposed are mostly medical-related. Although the Service Commercial designation is generally engaged in servicing and related sales, the designation permits a multitude of medical uses, including medical offices of any size and clinics/urgent cares, proposed within the Hanford Place development. The proposed development does not propose any use prohibited by the Service Commercial land use designation.

#### *Policy L53 Existing Service Commercial Designations*

Encourage existing service commercial centers to expand or adapt to market changes through reuse, rehabilitation, and infill development.

Analysis: The Hanford Place development does not constitute an existing Service Commercial development.

#### *Policy L54 Design of the Service Commercial Land Use Designation*

Require that new development projects and major site reconfigurations in the Service Commercial land use designation provide site layouts, landscaping, and screening so that the site appears aesthetically pleasing from the public street.

Analysis: The proposed development is designed with landscaping and screening which is aesthetically pleasing from the public street.

#### *Policy L55 Location and Size of Service Commercial Land Use Designation*

Locate Service Commercial land use designations along Highway 198 and where they can serve as a buffer land use, such as between residential areas and railroad corridors. Require new development projects to be a minimum of one acre.

Analysis: The Service Commercial land use designation will be located along Highway 198 and the Southern Pacific Railroad, as required. The Service Commercial land use designation will encompass approximately 30 acres of the development area.

### **4.4.3 High Density Residential**

The expected density range for High Density Residential is 14 to 29 units per gross acre with an expected typical density of 16 units per gross acre.

Analysis: The development proposes a 40-unit memory care facility, 40-unit assisted living facility and 90-multi-family units for a combined total of 170 residential units over approximately 10 acres (15 acres minus the five-acre storm drainage basin). The proposed density within the development is approximately 17 units per acre, which is within the prescribed density range of

the high-density residential zone district. At this time, the plan is conceptual, density will be verified during site plan review.

*Policy L38 Purpose of the High-Density Residential Land Use Designation*

Establish the High-Density Residential land use designation primarily for multi-family apartment and condominium development in proximity to Arterial streets, commercial and recreational facilities, and employment centers.

Analysis: The Hanford Place Development proposes to develop multi-family apartments and assisted living multi-family units within the plan area. The multi-family units will be proximal to employment opportunities within the Hanford Place Development, as well as the Adventist Health Hospital. The development is located 0.38 miles from the nearest arterial street, 12<sup>th</sup> Avenue.

*Policy L39 Typical Uses in the High-Density Residential Land Use Designation*

Define the uses allowed in the High-Density Residential land use designation to include multi-family residential dwellings in apartment buildings complexes.

Analysis: Multi-family residential dwellings are proposed within an apartment building complex in the development.

*Policy L40 Design of the High-Density Residential Land Use Designation*

Develop and enforce design policies and/or ordinances for High Density Residential developments that ensure high quality construction, design, open space amenities, safety and security, overall compatibility with the rest of the neighborhood.

Analysis: Development of the High-Density Residential land use within the Hanford Place Master Plan will be regulated through compliance with Section 17.14 of the Hanford Municipal Code, except where modified through development standards for the Hanford Place Master Plan.

*Policy L41 Location and Size of the High-Density Residential Land Use Designation*

Locate High Density Residential land use designations in close proximity to Arterial streets, commercial centers, recreational facilities, and employment centers.

Analysis: The High-Density Residential land use designation is proposed to be located along Glendale Avenue, between 11<sup>th</sup> and 12<sup>th</sup> Avenues, both of which are designed arterials. The designation will be located within the Hanford Place Mixed Use development, which provides employment opportunities for medical-related uses. The designation is also proximal to the Adventist Health Hospital, which is a large employment center for the City of Hanford.

The General Plan Amendment to change the land use designation from Highway Commercial to a combination of Service Commercial and High-Density Residential is consistent with the General Plan policy.

Additional Applicable Goals and Policies

**Economic Development and Employment Goals**

***Goal E1: A diverse and robust local economy capable of providing employment for all residents desiring to work in the city.***

Analysis: The proposed Hanford Place supports Goal E1 by providing medical-related employment opportunities for residents desiring to work in the City of Hanford.

***Policy P80 Health Care Services***

Support hospitals, clinics, shelters, and other medical services that meet the health care needs of Hanford's residents.

Analysis: The proposed Hanford Place development supports Policy P80 by supporting medical uses to meet the health care needs of Hanford's residents.

**Growth Management Goals**

***Goal L2: Development preference of vacant and underutilized properties.***

***Goal L3: Limitation of urban sprawl-style development patterns in new growth areas***

***Policy L11 Infill Development***

Support, encourage, and incentivize, to the extent possible, infill development projects that can effectively utilize existing transportation and utility infrastructure.

***Policy L107 Revitalization and Redevelopment***

Encourage property owners to revitalize or redevelop abandoned, obsolete, or underutilized properties to accommodate growth.

An infill development site is defined as any parcel or group of parcels that are vacant or underdeveloped and surrounded by development on at least 75% of its perimeter. Infill sites may include previously developed sites that may/will be redeveloped. Examples include:

- Mixed use development in the Downtown and/or in areas within walking distance to transit, employment centers, and commercial services where the environmental impacts of the development would be minimized.
- Targeted residential infill development that addresses the needs of seniors, lower income households, single households and empty nesters, young professionals, and other special needs groups.

***Policy L135 Infill Development Support***

Support, encourage and, to the extent possible, incentivize infill development projects that can effectively utilize existing transportation and utility infrastructure.

***Policy L137 Creative Design Solutions***

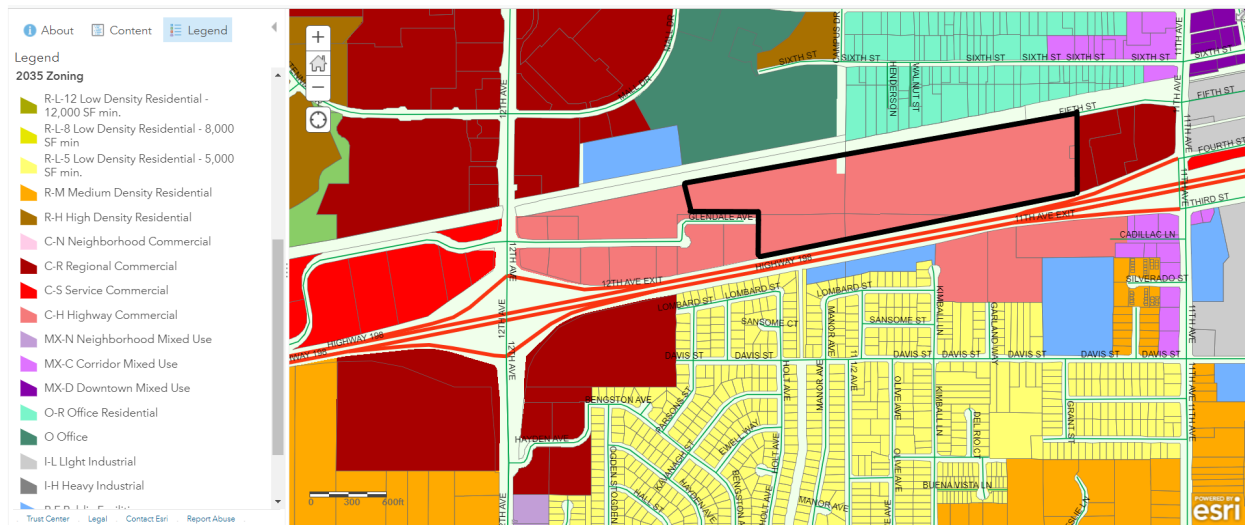
Allow unique, diverse, and creative design solutions for infill development that are compatible with and enhance surrounding land uses.

Analysis: The Hanford Place Development represents creative design solution to an in-fill development area. Development of this area gives preference to a vacant, underutilized property and limits growth to a new area. The project provides residential opportunities in proximity to existing and planned employment hubs. The project also proposes infill development that addresses the needs of seniors, such as memory care facilities and assisted living opportunities.

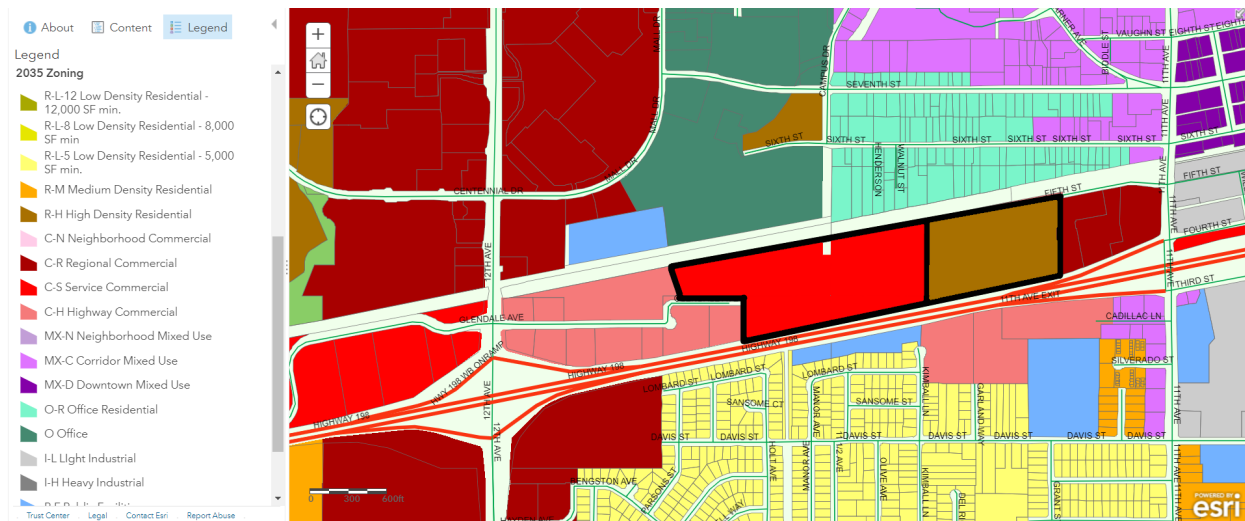
## Rezone No. 2022-01

Rezone No. 2022-01 is a request to change the zoning from C-H Highway Commercial to a combination of C-S Service Commercial and R-H High-Density Residential, due to incompatibility with the Hanford Place Master Plan and the existing C-H Highway Commercial zoning.

**Figure 9: Existing Zoning  
C-H Highway Commercial**



**Figure 10: Proposed Zoning  
C-S Service Commercial and R-H High-Density Residential**



The project is incompatible with the present zoning, since it proposes land uses that are not permitted in the C-H Highway Commercial zone district, including medical and professional offices, urgent care clinics, a nursing college or other satellite campus, and multi-family residential. (See Figures 4-6).

The uses proposed within the Hanford Place Master Plan are permitted in the C-S Service Commercial and R-H High-Density Residential zone district, as demonstrated in the Land Use tables, below.

**Figure 11: Zone Use Table  
Education, Religious, and Assembly Uses**

| Commercial, Office, and Industrial Zone Use Table                                   |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------|-----|-----|-----|-----------------|------|------|-----------------------------|---|-----|-----|-------------|----|----|------------------------------------------------------|
| P = Use Is Permitted by Right    C = Use Requires Conditional Use Permit            |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| A = Use Requires Administrative Use Permit    T = Use Requires Temporary Use Permit |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| Blank = Use Is Not Allowed                                                          |                                                                    |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| Land Uses                                                                           |                                                                    | Commercial Zones |     |     |     | Mixed Use Zones |      |      | Industrial and Office Zones |   |     |     | Other Zones |    |    | Specific Land Use Standards (See Identified Section) |
|                                                                                     |                                                                    | C-N              | C-R | C-S | C-H | MX-N            | MX-C | MX-D | O-R                         | O | I-L | I-H | AP          | PF | CO |                                                      |
| C                                                                                   | Education, Religious and Assembly Uses                             |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| C5                                                                                  | College or university, public or private                           |                  | C   | C   |     |                 | C    | C    |                             |   |     |     |             | P  |    |                                                      |
| C13                                                                                 | School; charter, trade, vocational, art, business, or professional |                  | C   | P   |     |                 | C    | C    | C                           | C | C   |     |             | P  |    |                                                      |

**Figure 12: Zone Use Table  
Office and Medical Uses**

| <b>Commercial, Office, and Industrial Zone Use Table</b><br>P = Use Is Permitted by Right    C = Use Requires Conditional Use Permit<br>A = Use Requires Administrative Use Permit    T = Use Requires Temporary Use Permit<br>Blank = Use Is Not Allowed |                                            |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------|-----|-----|-----|-----------------|------|------|-----------------------------|---|-----|-----|-------------|----|----|------------------------------------------------------|
| Land Uses                                                                                                                                                                                                                                                 |                                            | Commercial Zones |     |     |     | Mixed Use Zones |      |      | Industrial and Office Zones |   |     |     | Other Zones |    |    | Specific Land Use Standards (See Identified Section) |
|                                                                                                                                                                                                                                                           |                                            | C-N              | C-R | C-S | C-H | MX-N            | MX-C | MX-D | O-R                         | O | I-L | I-H | AP          | PF | CO |                                                      |
| <b>E</b>                                                                                                                                                                                                                                                  | <b>Office and Medical Uses</b>             |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| E4                                                                                                                                                                                                                                                        | Laboratory; general, medical or dental     |                  | C   | P   | C   |                 | P    | C    |                             | P | C   |     |             |    |    |                                                      |
| E5                                                                                                                                                                                                                                                        | Hospital, general or psychiatric           |                  |     |     |     |                 |      |      |                             | P |     |     |             | P  |    |                                                      |
| E6                                                                                                                                                                                                                                                        | Office; medical, dental, or optometry      |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Under 2,000 sq. ft.                        | P                | P   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | 2,000 – 6,000 sq. ft.                      | P                | C   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Over 6,000 sq. ft.                         | P                |     | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
| E7                                                                                                                                                                                                                                                        | Office; professional or commercial         |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Under 2,000 sq. ft.                        | P                | P   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | 2,000 – 6,000 sq. ft.                      | P                | C   | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
|                                                                                                                                                                                                                                                           | Over 6,000 sq. ft.                         | P                |     | P   |     | P               | P    | P    | P                           | P |     |     |             |    |    |                                                      |
| E8                                                                                                                                                                                                                                                        | Pharmacy                                   | P                | P   | P   |     | P               | P    | P    |                             | P |     |     |             |    |    |                                                      |
| E9                                                                                                                                                                                                                                                        | Urgent care center or other walk-in clinic | P                | C   | C   |     | P               | P    | P    |                             | P |     |     |             |    |    |                                                      |

**Figure 13: Zone Use Table  
Residential Uses**

| <b>Commercial, Office, and Industrial Zone Use Table</b><br>P = Use Is Permitted by Right    C = Use Requires Conditional Use Permit<br>A = Use Requires Administrative Use Permit    T = Use Requires Temporary Use Permit<br>Blank = Use Is Not Allowed |                                                                       |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------|-----|-----|-----|-----------------|------|------|-----------------------------|---|-----|-----|-------------|----|----|------------------------------------------------------|
| Land Uses                                                                                                                                                                                                                                                 |                                                                       | Commercial Zones |     |     |     | Mixed Use Zones |      |      | Industrial and Office Zones |   |     |     | Other Zones |    |    | Specific Land Use Standards (See Identified Section) |
|                                                                                                                                                                                                                                                           |                                                                       | C-N              | C-R | C-S | C-H | MX-N            | MX-C | MX-D | O-R                         | O | I-L | I-H | AP          | PF | CO |                                                      |
| <b>H</b>                                                                                                                                                                                                                                                  | <b>Residential Uses</b>                                               |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    |                                                      |
| H1                                                                                                                                                                                                                                                        | Assisted living, skilled nursing, or hospice facility                 |                  |     |     |     | C               | C    | C    | C                           |   |     |     |             |    |    |                                                      |
| H6                                                                                                                                                                                                                                                        | Hotel or motel                                                        |                  | C   | C   | P   |                 | P    | P    |                             |   |     |     |             |    |    |                                                      |
| H7                                                                                                                                                                                                                                                        | Live/work facility                                                    |                  |     | P   |     | P               | P    | P    | P                           |   |     |     |             |    |    |                                                      |
| H8                                                                                                                                                                                                                                                        | Mobile home park                                                      |                  |     |     |     |                 |      |      |                             |   |     |     |             |    |    | 17.60.100                                            |
| H9                                                                                                                                                                                                                                                        | Multifamily dwelling, 2 units per building (duplex)                   |                  |     |     |     | P               | P    | P    | P                           |   |     |     |             |    |    |                                                      |
| H10                                                                                                                                                                                                                                                       | Multifamily dwelling, 3 or 4 units per building (triplex or fourplex) |                  |     |     |     | P               | P    | P    | C                           |   |     |     |             |    |    |                                                      |
| H11                                                                                                                                                                                                                                                       | Multifamily dwelling, 5 or more units per building                    |                  |     |     |     | P               | P    | P    |                             |   |     |     |             |    |    |                                                      |

**Figure 14: Residential Zone Use Table**

| <b>Residential Zone Use Table</b><br>P = Use Is Permitted by Right    C = Use Requires Conditional Use Permit<br>A = Use Requires Administrative Use Permit    T = Use Requires Temporary Use Permit<br>Blank = Use Is Not Allowed |                                                                       |                                 |       |       |                               |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------|-------|-------|-------------------------------|-----|
| Land Uses                                                                                                                                                                                                                          |                                                                       | Single-Family Residential Zones |       |       | Multifamily Residential Zones |     |
|                                                                                                                                                                                                                                    |                                                                       | R-L-12                          | R-L-8 | R-L-5 | R-M                           | R-H |
| <b>1</b>                                                                                                                                                                                                                           | <b>Residential Uses</b>                                               |                                 |       |       |                               |     |
| 1                                                                                                                                                                                                                                  | Assisted living, skilled nursing, or hospice facility                 | C                               | C     | C     | C                             | C   |
| 10                                                                                                                                                                                                                                 | Multifamily dwelling, 2 units per building (duplex)                   |                                 |       | C     | P                             | P   |
| 11                                                                                                                                                                                                                                 | Multifamily dwelling, 3 or 4 units per building (triplex or fourplex) |                                 |       | C     | P                             | P   |
| 12                                                                                                                                                                                                                                 | Multifamily dwelling, 5 or more units per building                    |                                 |       |       | P                             | P   |

Pursuant to HMC 17.06.060 Zone Changes, changes to the zoning map shall be approved by ordinance of the City Council, in accordance with Chapter 17.86. Chapter 17.86 of the Municipal Code describes the process for consideration of a Rezone. The reviewing authority is required to make the required findings below:

1. That the amendment is internally consistent with the goals, objectives, and policies of the General Plan and the Municipal Code.



Analysis: That Rezone No. 2022-01 is internally consistent with the goals, objectives, and policies of the General Plan, specifically consistent with Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80 (as described in the General Plan Amendment section, above). All regulations pertaining to C-S – Service Commercial and R-H High-Density Residential zone district will be enforced as development occurs through the Site Plan Review process, except as expressly modified by the Hanford Place Development Master Plan.

2. The amendment would not be detrimental to the public health, safety, or welfare of the community.

Analysis: That this application has been reviewed by County departments, utility companies, City Fire Department, City Building Department, and other involved departments. Any mitigation required for public health and safety were applied to the proposal and required in the mitigation monitoring and reporting program.

3. The amendment would maintain the appropriate balance of land uses within the City.

Analysis: That jobs-housing balance is achieved by increasing opportunities for people to work and live in close proximity. The ratio is expressed as the number of jobs divided by the number of housing units. The jobs-housing balance is a general tool for analyzing where people work, where they live, and how effectively they can travel between the two. In the planning area, the jobs-housing balance ratio in 2013-2014 was 1.17. It is estimated that the implementation of the General Plan would increase the jobs-housing balance by 0.45 to 1.62, which would make the planning area a jobs-rich area. The proposal to change the designation from Highway Commercial to a combination of Service Commercial and High-Density Residential will impact the job-housing balance projected by increasing the number of residential units in the area. The addition of the residential units to the formerly commercial designation will not affect the City's ability to maintain an appropriate balance of land uses within the City, as the increase in housing will bring more residential units to the jobs-rich planning area.

4. The anticipated land uses on the subject site would be compatible with existing and future surrounding uses.

Analysis: That the Hanford Place Master Plan proposes the development of a medical and mixed-use development on property proposed to be zoned C-S Service Commercial and R-H High-Density Residential. The land uses within the Hanford Place development are compatible with the surrounding land uses and compatible with future surrounding lands uses.

| Direction | Existing Land Use                                                    | General Plan Designation                                | Zone District                                                             |
|-----------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|
| North     | Railroad; Adventist Health Medical Center; single-family residential | Office; Office Residential                              | O Office; O-R Office Residential                                          |
| South     | CA-198; car dealership; basin; single-family residential             | Highway Commercial, Open Space, Low-Density Residential | C-H Highway Commercial, PF Public Facility, R-L-5 Low-Density Residential |
| East      | Integrate shopping center – grocery, retail, gym, restaurant         | Regional Commercial                                     | C-R Regional Commercial                                                   |

|      |                                                                     |                    |                        |
|------|---------------------------------------------------------------------|--------------------|------------------------|
| West | Veterinary hospital, mini-storage, California Highway Patrol, hotel | Highway Commercial | C-H Highway Commercial |
|------|---------------------------------------------------------------------|--------------------|------------------------|

The project will be developed in conformance with the C-S Service Commercial and R-H High-Density Residential zone district regulations, except where expressly modified by the Hanford Place Master Plan (PUD).

### **Planned Unit Development No. 2023-01**

Planned Unit Development No. 2023-01 proposes the development of the Hanford Place Master Plan. The proposed Hanford Place Master Plan is attached as **Attachment 1**.

Planned Unit Development

#### **17.82.010 Purpose**

Planned unit developments (PUDs) are encouraged to achieve a more functional, aesthetically pleasing, and harmonious living and working environment within the City that otherwise might not be possible by strict adherence to the provisions of this title. In certain instances, the objectives of this title may be achieved by development that does not conform in all respects with the land use pattern designated on the zoning map or in the zone districts prescribed by this title.

#### **17.82.030 Allowed Planned Unit Developments**

A planned unit development may be utilized to achieve one (1) or more of the following objectives *(the objectives sought by this PUD application are denoted by a check mark)*

- ✓ A. To permit a site within more than one (1) zone district to mix the permitted or conditionally permitted land uses of both zones within the site without regard to the zone district boundary.
- B. To permit development intensity greater than would otherwise be permitted by the implementation of the standards of the zone district in which the site is located.
- ✓ C. To permit the lot patterns on size, shape, and layout that would otherwise not be permitted by the standards of the zone district in which the site is located.
- ✓ D. To modify the required building setbacks, distances between structures, and landscaped areas that would otherwise be required by this title.
- E. To permit variations to the standard local street cross-sections.
- F. To permit private streets and gated neighborhoods.
- G. To permit the implementation of the mixed-use provisions in the MX-N, MX-C, or MX-D zone districts; and
  - ✓ To reduce the amount of required parking spaces when spaces are shared among multiple land uses.

#### **17.82.040 Prohibited Planned Unit Developments**

A planned unit development is prohibited from being used to achieve one (1) or more of the following:

- A. To add land uses that are not otherwise permitted in the zone district in which the PUD is located.

Analysis: With the proposal to change the land use designation and zoning from C-H Highway Commercial to C-S Service Commercial and R-H High-Density Residential, the Master Plan does not propose to add land uses that are not otherwise permitted in the zone district in which the PUD will be located. All uses proposed are consistent with the uses permitted in the C-S Service Commercial and R-H High-Density Residential land use.

- B. To increase residential densities beyond the maximum allowed by the General Plan.

Analysis: The residential densities proposed within the Hanford Place Master Plan are consistent with the allowable density in the High-Density Residential land use designation, which is the land use sought through General Plan Amendment No. 2022-01.

- C. To modify sign standards or provisions in Chapter 17.56; or

Analysis: The applicant proposes to develop a Sign Program, consistent with the standards set forth in 17.56.220.

- D. To modify parking and loading standards or provisions in Chapter 17.54, except as stated in Section 17.82.030.

Analysis: Parking is proposed as follows within the Hanford Place Master Plan:

- a. motel or hotel - 1 space per guest room plus 1 space per employee.
- b. assisted living, skilled nursing facility, or hospice - 1 space for every 4 beds.
- c. multifamily dwellings - at least 50% of spaces shall be covered.
  - i. one-bedroom - 1.5 spaces per dwelling unit
  - ii. two-bedroom - 1.75 spaces per dwelling unit
  - iii. three or more bedrooms - 2 spaces per dwelling unit
- d. all other allowed uses - 1 space per 350 square feet of building space.

The Hanford Place Master Plan does not seek to allow any of the specified prohibited objectives.

#### **17.82.050 Site Area**

- A. The minimum site area for a planned unit development shall be five (5) acres, except that there shall be no minimum site area requirements if the site is an infill development site.
- B. The site area may be made up of more than one (1) parcel, however all parcels in the site area shall be contiguous.

Analysis: The Hanford Place Master Plan encompasses 39.16 acres.

#### **17.82.060 Findings**

- A. Before a planned unit development (PUD) permit can be approved, all of the following findings shall be made by the reviewing authority identified in Chapter 17.70:
1. The location and design of the PUD is in accordance with the purpose of this title.
  2. The PUD is being proposed to achieve one (1) or more of the objectives identified in Section 17.82.030.
  3. The location and design of the PUD and the conditions under which it would be operated or maintained will not be detrimental to the public health, safety or welfare of the community to properties or improvements in the vicinity.
  4. The location and design of the PUD will not generate more traffic than the streets in the vicinity can carry without congestion and will not overload utilities.
  5. That PUD's population density, site area and dimensions, site coverage, yard spaces, height of structures, distances between structures, off-street parking and off-street loading facilities, landscaped areas and street design will produce an environment of stable and desirable character consistent with the purpose of this title.
  6. The combination of different dwelling types, architectural appearance, and/or varieties of land uses in the development will complement each other and will harmonize with the existing and proposed land uses in the vicinity; and
- B. A PUD may be denied if the reviewing authority finds one (1) or more of the findings in this section cannot be made.

Analysis: The required findings are able to be supported, as demonstrated in the Findings of Approval section.

Conformance with the standards of the C-S – Service Commercial and R-H High-Density Residential Zone Districts

**17.20.030 Service Commercial Site Area**

In the C-S – Service Commercial zone district, the minimum site area shall be 5,000 square feet.

**17.14.030 High-Density Residential Lot Area**

In the R-H High-Density Residential zone district, the minimum lot area shall be 5,000 square feet, however existing lots of less than 5,000 square feet may be developed in accordance with the specifications of Section 17.14.

**Analysis:** The project site encompasses a total of 39.16 acres. The C-S Service Commercial portion of the development is 25.9 acres. The R-H High-Density Residential portion of the development is approximately 10 acres. *The remaining acreage represents right-of-way dedication.*

**17.20.040 Service Commercial Lot Dimensions**

In the C-S – Service Commercial zone district, the minimum lot frontage shall be forty (40) feet, unless a reciprocal use agreement for shared common access and parking areas is recorded with the Kings County recorder's office.

#### 17.14.040 High-Density Residential Lot Dimensions

In the R-H High-Density Residential zone district:

- A. The minimum lot frontage shall be forty (40) feet.
- B. The minimum lot width shall be fifty (50) feet for interior lots and sixty (60) feet for corner lots.
- C. The minimum lot depth shall be ninety (90) feet.
- D. Lots developed adjacent to an arterial or collector street are to be designed as walled or fenced back-on or side-on lots with a minimum five (5) and maximum ten (10) foot wide landscape easement continuous and adjacent to the street right-of-way line. The minimum lot dimensions are to be exclusive of the landscape easement area. The wall or fence shall be located in the landscape easement area adjacent to the easement line.

**Analysis:** The entire project site is formed by four parcels. Each parcel will have street frontage when Glendale Avenue and Campus Drive are extended, as shown below.



The Hanford Place Master Plan shows future pad development; however, parcel division is not proposed at this time. Future division will be evaluated through the Tentative Parcel Map process, subject to Planning Commission review.

#### 17.14.050 High-Density Residential Site Area Per Dwelling Unit

In the R-H High-Density Residential zone district, the minimum site area per dwelling unit shall be fifteen hundred (1,500) square feet. 170 multi-family units are proposed throughout the Hanford Place Master Planned Development. The 170 units are a combination of multi-family units, assisted living units, and a memory care facility. The entire Hanford Place Master Plan encompasses 39.16 acres (1,705,810 square feet). The number of units proposed does not exceed the square footage required per unit.

The Hanford Place Master Plan is conceptual. Future development of residential units will be evaluated to ensure the number of units per site area does not exceed the prescribed requirement.

#### **17.20.050 Service Commercial Coverage**

In the C-S – Service Commercial zone district, the maximum coverage of a lot shall be determined by the combined building setback area requirements, open space requirements, and off-street parking and loading requirements.

#### **17.14.060 High-Density Residential Coverage**

In the R-H High-Density Residential zone district, the maximum coverage of a lot shall be determined by the combined building setback area requirements, accessory structure limitations, open space requirements, and off-street parking requirements.

All required building setbacks, landscaping, off-street parking and loading requirements will be evaluated and mandated as part of the site plan review process, upon physical development.

#### **17.20.060 Service Commercial Building Setback Areas**

In the C-S – Service Commercial zone district, no structure shall be placed within a building setback area.

Front:

The front building setback area shall be a minimum of 15 feet, except that in C-S zones bounded by State Route 198, 10th Avenue, 11th Avenue, and Sixth Street there is no minimum front building setback area requirement. The project site is bounded by State Route 198 to the south.

Rear:

The rear building setback may be zero (0) feet from the rear lot line, except where the rear lot line abuts a public street in an R-L, R-M, R-H, OR, O, PF, AP, or CO zone district then the rear building setback shall be fifteen (15) feet.

Side:

The side building setback area shall be zero (0) feet, except that where the side lot line abuts a public street or an R-L, R-M, R-H, OR, O, PF, AP, or CO zone districts the side building setback area shall be 15 feet.

#### **17.14.070 High-Density Residential Building Setback Areas**

In the R-H High-Density Residential zone district, no structure shall be placed within a building setback area.

Front:

The front building setback area shall be fifteen (15) feet from the front lot line for livable building space and twenty (20) feet for garages, carports, and other non-livable building space.

Rear:

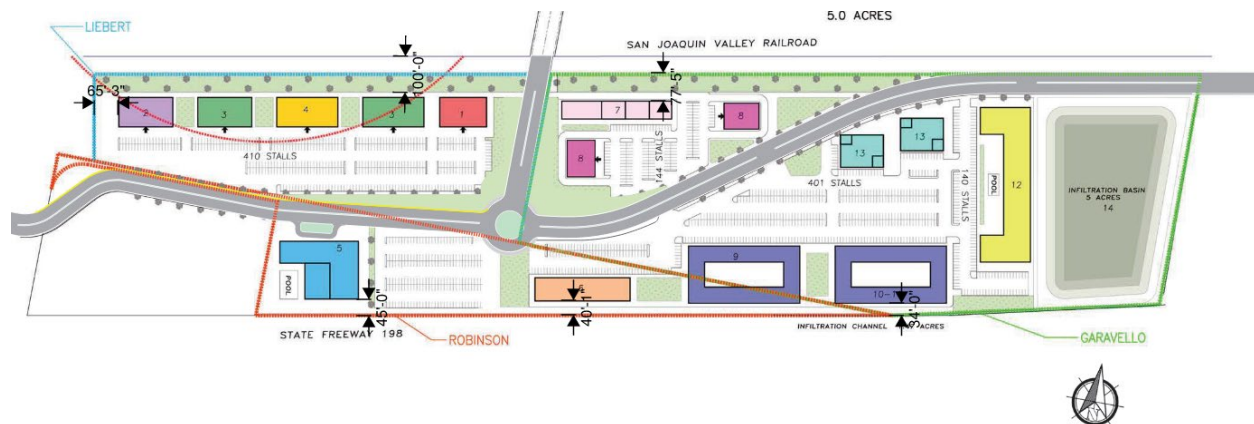
The rear building setback shall be fifteen (15) feet from the rear lot line, except where there is a landscape easement with a wall or fence on the rear of the lot then the rear building setback shall be twenty (20) feet. The rear building setback area shall be increased by ten (10) feet for buildings over one story high.

Side:

The side building setback area shall be five (5) feet from an interior side lot line and ten (10) feet from a street side property line. Where there is a landscape easement with a wall or fence on the street side of the lot the side yard setback area shall be measured from the easement area instead of the side lot line.

**Analysis:** As part of the Hanford Place Master Plan, project-specific setbacks have been identified in the Design Conditions (p. 5 of the Master Plan), as follows:

- Additional building setbacks are not required between the two zones within the PUD plan area. The C-S zone required setbacks shall apply to the entire PUD plan area.



The conceptual site plan shown in the Hanford Place Master Plan shows buildings setback approximately 77 feet from the northern most property boundary, 65 feet from the western property boundary, and a minimum of 34 feet from the southern property boundary.

The following setbacks will be enforced during Site Plan Review for the Hanford Place Master Plan

| Direction           | Setback (measured in feet)                                  |
|---------------------|-------------------------------------------------------------|
| Front Setback       | 15 feet; No minimum for lots bounded by State Route 198 (0) |
| Rear Setback        | No minimum required (0)                                     |
| Side Setback        | No minimum required (0)                                     |
| Street-Side Setback | 15 feet                                                     |

#### **17.20.070 Service Commercial Distances Between Structures**

In the C-S – Service Commercial zone district, the minimum distance between a structure used solely for residential purposes and another structure shall be 10 feet, except as provided by the building code.

#### **17.14.080 High-Density Residential Distances Between Structures**

In the R-H High-Density Residential zone district, the minimum distance between structures shall be ten (10) feet, except as provided by the building code.

**Analysis:** As required, the minimum distance between structures within the Hanford Place Master Plan will be 10 feet, except as provided by building code.

#### **17.20.080 Service Commercial Height of Structures**

In the C-S – Service Commercial zone district, the maximum structure height shall be 50 feet.

#### **17.14.090 High-Density Residential Height of Structures.**

The maximum structure height shall be thirty-five (35) feet.

**Analysis:** As part of the Hanford Place Master Plan, project-specific height limitations have been identified in the Design Conditions (p. 5 of the Master Plan), as follows:

- The maximum building height for the PUD area shall be per the C-S zone, which is 50 feet.

The requested height is able to be supported. There is no conflict with the height proposed and the Airport Land Use Compatibility Plan, as the project area is located outside of the Airport Protection Zone.

#### **17.20.090 Service Commercial Driveways**

In the C-S – Service Commercial zone district, wherever possible developments shall share driveways to minimize the number of driveways on public streets. New driveways near street corners shall be located a minimum 100 feet from the radius curve of the curb, unless otherwise specifically approved by the City Engineer. Sites with alleys should utilize alley access to minimize driveways on streets to the greatest extent possible.

#### **17.14.100 High-Density Residential Driveways**

In the R-H High-Density Residential zone district, the width of a driveway and any paved area shall not cumulatively exceed forty percent (40%) of the width of the lot's street frontage on which the driveway and any paved area faces. In the case of "L" or "U" shaped driveways or other configurations besides perpendicular driveways the paved area of these driveways shall not exceed fifty percent (50%) of the front building setback area. On corner lots, the driveway shall be located on the side of the lot adjacent to the interior lot line. On key lots the driveway shall be located on the side of the lot which is not adjacent to the rear lot line of the adjacent reverse corner lot.



**Analysis:** The Hanford Place Master Plan proposes to develop shared driveways and establish cross-access throughout the Master Planned development. Access will be generally located as shown in red, below:



The location of driveways will be proposed and reviewed by the City Engineer and Fire Department during Site Plan Review when physical, site-specific development is proposed.

#### 17.20.100 Service Commercial Off-Street Parking

Off-street parking and off-street loading facilities shall be provided on the site for each use as prescribed in Chapter 17.54. In the C-S Service Commercial zone district, parking areas shall not be closer than five (5) feet to any front or street side lot line. The area between the lot line and parking area shall be landscaped. New parking areas should be located behind or to the side of buildings, not between buildings and the street.

#### 17.14.130 High-Density Residential Off-Street Parking

In the R-H High-Density Residential zone district, off-street parking and off-street loading facilities shall be provided on the site for each use as prescribed in Chapter 17.54, and as follows:

- A. Required parking spaces may not be provided in any front, side, or rear building setback area.
- B. The minimum parking space dimensions shall be nine (9) feet wide by eighteen and one-half (18.5) feet long.
- C. No recreation vehicle, including without limitation camping trailer, boat trailer, utility trailer, boat, pickup camper, motor home, dune buggy, or similar vehicle/trailer shall be stored or parked, except within an enclosed side or rear yard or within a garage or carport except if a side or rear yard is not accessible due to existing legal permanent structures, a recreational vehicle or trailer may be parked in a driveway or adjacent to a driveway if it does not create a nuisance or safety problem as determined by the Community Development Director.

- D. All recreational vehicles or trailers parked in a location visible from the street are to be clean and maintained so as not to detract from the neighborhood. Also, see Chapter 10.76 of the Hanford Municipal Code.
- E. No recreational vehicle or trailer shall be used as a residence.
- F. All motor vehicles incapable of movement under their own power, other than in cases of emergency, shall be stored in an entirely enclosed space, garage, or carport. Vehicles with custom fitted covers may be stored in an open area when it does not create a nuisance or safety problem as determined by the Community Development Director, cause complaints from neighbors or violate any section of this code.
- G. Repair of vehicles owned by the resident of the property and storage of parts shall be within an enclosed garage or carport, if no garage exists. Repair of vehicles not owned by the resident of the property is prohibited. Vehicle repair and storage of parts are prohibited in a driveway and the front or street side building setback areas.
- H. Garages and carports are to be primarily used for the parking of four-wheeled vehicles. The use of garages or carports for general storage, recreation activities or other uses that prevent the use of the garage or carport for the parking of at least one four-wheeled vehicle is prohibited.
- I. Except for driveways allowed in the front building setback area, all additional parking for residential uses shall be to the rear or side of the dwelling. No parking shall occur in the front or street side building setback areas.

Analysis: The Hanford Place Master Plan proposes parking to adhere to the following prescribed ratios:

- a. motel or hotel - 1 space per guest room plus 1 space per employee.
- b. assisted living, skilled nursing facility, or hospice - 1 space for every 4 beds.
- c. multifamily dwellings - at least 50% of spaces shall be covered.
  - i. one-bedroom - 1.5 spaces per dwelling unit
  - ii. two-bedroom - 1.75 spaces per dwelling unit
  - iii. three or more bedrooms - 2 spaces per dwelling unit
- d. all other allowed uses - 1 space per 350 square feet of building space.

Parking will be required to be located outside of any required setback area, at a minimum of five feet from any front or street-side lot line. Although the C-S Service Commercial zone district specifies that parking shall not be located between buildings and the street, this is not required within the Hanford Place Master Plan. A deviation will be allowed through the Planned Unit Development process.

Parking will be further evaluated during the site plan review process to ensure compliance with the requirements set forth.

#### **17.20.110 Service Commercial Usable Open Space**

There is no minimum requirement for usable open space in the C-S – Service Commercial zone district.

#### **17.14.140 High-Density Residential Usable Open Space**

In the R-H High-Density Residential zone district, lots with four (4) or less dwelling units shall provide for a usable open space area of a minimum three hundred (300) square feet per dwelling unit. The open space shall be a minimum fifteen (15) feet wide. Lots with five (5) or more dwelling units shall provide for a usable open space area equal to five percent (5%) of the lot area. Where multiple lots that together make up a single development site, the required open space may be combined into common open space areas that are accessible to all residents of the site.

**Analysis:** Per the conceptual site plan provided within the Master Plan, a swimming pool is proposed to serve as the common open space in the multi-family development. Swimming pools are permitted as common open space, as described in Section 17.98.020 Definition of Terms.

“Open space, common usable” means recreational or leisure space for the shared use of residents of a multi-unit development with no dimension less than twenty (20) feet and may include gardens, playgrounds, courtyards, swimming pools, sitting areas, court games, recreation rooms, exercise rooms or gyms, spas, community rooms, lawn/turf used for open play, ponds, fountains, atriums, picnic areas, rooftop gardens or green roofs, or similar uses or facilities.

Open space will be required to be provided in an area equivalent to five percent of the total site area associated with the multi-family use. Open space is not required to be provided within the C-S Service Commercial portion of the plan.

#### **17.14.110 High-Density Residential Accessory Structures**

In accordance with the R-H High-Density Residential zone district standards, accessory structures may be located with a required rear or side building setback area subject to all of the following:

- A. The floor area shall be a maximum one hundred twenty (120) square feet.
- B. The walls shall be at least three (3) feet from rear and side lot lines.
- C. The roof eaves shall be at least two (2) feet from rear and side lot lines.
- D. The accessory structure shall be separated from other structures by a minimum of ten (10) feet.
- E. The plate line height shall be a maximum seven (7) feet high.
- F. The roof pitch shall be a maximum 4:12.
- G. The roof ridge peak height shall be a maximum of ten (10) feet.

**Analysis:** Accessory structures are not proposed at this time; future proposal of accessory structures will be required to adhere to the above standards within the R-H High-Density Residential portion of the plan.

#### **17.14.120 High-Density Residential Other Setback Standards**

The following setback standards shall apply to mechanical equipment, garages and carports, swimming pools, decks, balconies, and other types of platforms.

- A. Mechanical equipment shall be located a minimum of five (5) feet from a side lot line that adjoins a neighboring side lot line.
- B. Garages or carports opening onto an alley shall be set back twenty-five (25) feet from the far side of the alley, provided that the structure, including roof overhang, shall not extend into the alley right-of-way. (No alleys proposed within the development)
- C. Above or below ground swimming pools shall be set back five (5) feet from all lot lines.
- D. Decks, balconies, and other types of platforms with a floor height over two (2) feet high shall be set back five (5) feet from the rear and interior side lot lines and ten (10) feet from the street side lot line.
- E. Garages and carports opening on the street side lot line of a corner lot shall be set back twenty (20) feet from the street side lot line. (Ord. 17-04, 2017)

**Analysis:** Mechanical equipment, garages and carports, swimming pools, decks, balconies and other platforms will be evaluated and required to adhere to the above standards within the R-H High-Density Residential portion of the Master Plan area.

#### **17.20.120 Service Commercial Landscaping**

In the C-S – Service Commercial zone district, landscaping shall be provided and permanently maintained in a setback area not less than 15 feet from a lot line adjoining a street, except where the setback area is covered by structures, parking, or driveways.

#### **17.14.150 High-Density Residential Landscaping**

In the R-H High-Density Residential zone district, except for driveways and approved parking areas all yard areas and setback areas visible from the street(s) shall be landscaped with live plant materials and ornamentation common to the Hanford Area or up to 100 percent of the yard and setback area may be landscaped with artificial turf and other permeable surfaces.

**Analysis:** The conceptual site plan within the Master Plan shows landscape areas within all areas not used for parking, structures, or driveways and specifies that landscaping design shall be consistent between the sites in the PUD plan area. As required, during the site plan review process, the Site Plan Review Committee will require all areas not covered by structures, parking, or driveway shall be landscaped with live plant material, artificial turf, or other permeable surfaces, consistent with State law.

#### **17.20.130 Service Commercial Screening, Fences, and Walls**

In the C-S – Service Commercial zone district, a block wall with a minimum height of seven (7) feet shall be provided along any side or rear lot line that abuts an R-L, R-M, R-H, OR, PF, AP, or CO zone district. No fence or wall shall be placed in front of or within any landscaped area located next to a street.

#### **17.14.160 High-Density Residential Screening, Fences, and Walls**

In the R-H High-Density Residential zone district, all fences and walls shall be provided on the site for each use in accordance with Section 17.50.120, which requires:

Fences and walls in the R-L, R-M, R-H, OR O and PF zone districts shall be constructed or installed in accordance with the following:

- A. Along a rear lot line not exceeding seven (7) feet in height.
- B. Along an interior side lot line not exceeding seven (7) feet in height beginning at ten (10) feet from the front lot line.
- C. On a corner lot along the street side lot line not exceeding seven (7) feet in height beginning at twenty-five (25) feet from the front lot line. On a reverse corner lot, the fence or wall is to be set back from the street side lot line five (5) feet. On a reverse corner lot, the rear lot line fence is not to extend beyond the five (5) foot street side building setback area.
- D. On a corner lot when a residence is constructed with its front access facing the street side lot line of a corner lot, a six (6) foot high fence is to be placed ten (10) feet behind the front property line. The street corner forty-five (45) degree angle line of sight is to be maintained as described in subsection H of this section. When the front of the house fronts the street side lot line a fence exceeding three (3) or four (4) feet in height as described in subsections E and F of this section is to be set back ten (10) feet from the street side lot line.
- E. Along a front lot line not exceeding three (3) feet in height.
- F. Along a front lot line not exceeding four (4) feet in height when the upper one (1) foot is fifty percent (50%) or more open.
- G. Along a front lot line an open chain link fence up to seven (7) feet in height may be located in conjunction with a public or quasi-public playground or park use.
- H. A six (6) foot fence or wall may be located in a front building setback area when set back ten (10) feet from the front lot line. Except in the case of a corner lot, the fence wall shall begin a forty-five (45) degree angle at a point twenty-five (25) feet from the front lot line located on the street side lot line.

**Analysis:** As identified in the initial study, six-and-a-half foot-high sound walls would mitigate noise impacts for outdoor uses, such as the swimming pools within the hotel and multi-family units. Aside from the sound walls proposed to reduce noise impacts, fencing and walls are not proposed within the Hanford Place Master Plan.

As part of the Hanford Place Master Plan, project-specific fencing and walls have been identified in the Design Conditions (p. 5 of the Master Plan), as follows:

- A block wall is not required within the PUD plan area between the zones.

Requests for placement of walls will be reviewed and required as part of the Site Plan Review process.

#### **17.20.140 Service Commercial Signs**

Signs placed in the C-S – Service Commercial zone district shall be subject to the requirements and standards prescribed in Chapter 17.56.

#### **17.14.170 High-Density Residential Signs**

Signs placed in the R-H High-Density Residential zone district shall be subject to the requirements and standards prescribed in Chapter 17.56.

**Analysis:** No signage is proposed at this time. The applicant proposes the development of a Master Sign Program for the Hanford Place Master Plan area, as described in the Design Conditions (p. 5 of the Master Plan):

- A sign program shall be established prior to building permit approval for the first office or commercial use. The sign program would not apply to residential, and hotel/motel uses, which would follow sign standards in the Zoning Ordinance.

Establishment of a sign program for a project requiring Planning Commission review, requires approval by the Planning Commission, as described in Section 17.56.220 of the Hanford Municipal Code:

#### **17.56.220 Master Sign Program**

- A. The purpose of the master sign program provisions is to provide a coordinated and flexible design approach to signage for Hanford's commercial shopping districts and office parks. A master sign program is required for any site that contains more than three (3) commercial establishments.
- B. A master sign program shall be reviewed by the Community Development Director as an administrative use permit. The Planning Commission shall approve a master sign program when it is proposed with a development project that requires a conditional use permit.
- C. A master sign program shall not be used to grant of a special privilege nor provide more visibility or exposure than is available to similarly situated properties.
- D. Master sign programs shall feature a unified and coordinated approach to the materials, color, size, type, placement and general design of signs proposed for a project or property.
- E. Reasonable conditions of approval may be imposed to achieve the purposes of this section and ensure internal sign design consistency on the site.
- F. After approval of a master sign program, no sign shall be erected, placed, painted, or maintained, except in conformance with such program, and such program shall be enforced in the same way as any provision in this section.
- G. The master sign program and all conditions of approval shall be attached to the lease agreements for all leasable space subject to the master sign program.

- H. Approval of a master sign program does not waive the permit requirements for individual signs that are subject to the program.
- I. The Community Development Director may approve minor amendments to a master sign program that are in substantial conformance with the original approval. All other amendments, including amendments to conditions of approval, shall be processed as a new application. Proposed amendments shall include written concurrence by the property owner.

The Master Sign Program will apply to all uses in the C-S Service Commercial portion of the plan, except for the hotel.

The hotel will be subject to the following sign standards, established by the Municipal Code for the C-S Service Commercial zone district.

**Table [17.56.090\(A\)](#)**

| <b>Number and Size of Permanent Signs by Zone</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Zone District</b>                              | <b>Building Signs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Freestanding Signs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| C-N, C-R, C-S, C-H, MX-N, MX-C, and O zones       | <p>No limit to number of signs per business establishment. Allowed square footage per building frontage is cumulative.</p> <p>Establishments with primary building frontage less than 300 feet: 2 sq. ft. per 1 lineal foot up to a maximum 350 sq. ft. along primary frontage. 50 sq. ft. allowed regardless of frontage length.</p> <p>Secondary building frontage: 1 sq. ft. per lineal foot up to a maximum 200 sq. ft. per secondary frontage. 35 sq. ft. allowed regardless of frontage length.</p> <p>Sites within 100 feet of State Route 198 may count the frontage facing State Route 198 as their primary frontage for the purpose of calculating maximum sign size.</p> | <p>1 sign per establishment maximum.</p> <p>40 sq. ft. maximum sign face size.</p> <p>6 feet high maximum if set back 10 feet from property line.</p> <p>5 feet high maximum if set back 5 feet from property line.</p> <p>4 feet high maximum if set back 0 feet from property line.</p> <p>Sites with an integrated shopping center: 1 additional freestanding sign up to 350 sq. ft. Maximum height not greater than 1.5 times the average height of the building.</p> |

The uses proposed within the R-H High-Density Residential portion of the plan will be subject to the following sign standards, established by the Municipal Code:

**Table [17.56.090\(A\)](#)**

| Number and Size of Permanent Signs by Zone                                                     |                                                                                                                                                       |                                                                                                             |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Zone District                                                                                  | Building Signs                                                                                                                                        | Freestanding Signs                                                                                          |
| AP, R-L, R-M, and R-H zones with 4 or less residences per site                                 | 1 sign per residence maximum.<br>4 sq. ft. maximum size per sign.<br>Placement a maximum 8 feet high.<br>External illumination only.                  | None allowed.                                                                                               |
| AP, R-M, and R-H zones with 5 or more residences per site or with non-residential uses on site | 1 sign per street frontage maximum.<br>30 sq. ft. maximum size per sign.<br>Placement a minimum 5 feet below roofline.<br>External illumination only. | 1 sign per site maximum.<br>20 sq. ft. maximum size.<br>6 feet high maximum.<br>External illumination only. |

#### 17.20.150 Service Commercial General Provisions and Standards

No business, service, or processes that is not a part of the main use of the site shall be conducted outside a completely enclosed permanently fixed structure, except where specifically permitted by this title. Mechanical equipment shall be located a minimum of five (5) feet from a rear or side lot line that abuts an R-L, R-M, R-H, OR, O, PF, AP, or CO zone district.

#### 17.14.180 High-Density Residential General Provisions and Standards

In accordance with the R-H High-Density Residential zone district standards, structures and the use of structures or land shall be subject to the requirements and standards prescribed in Chapter 17.50.

**Analysis:** The Hanford Place Development will be developed consistent with the General Provisions set forth for the C-S Service Commercial and R-H High-Density Residential zone district.

### FINDINGS FOR APPROVAL

#### General Plan Amendment No. 2022-01

In accordance with HMC Section 17.88.040, before a general plan amendment may be approved, all of the following findings shall be made by the reviewing authority:

1. That the amendment is internally consistent with the goals, objectives, and policies of the General Plan and the Municipal Code.

Analysis: That Rezone No. 2022-01 is internally consistent with the goals, objectives, and policies of the General Plan, specifically consistent with Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80 (as described in the General Plan Amendment section, above). All regulations pertaining to C-S – Service Commercial and R-H



High-Density Residential zone district will be enforced as development occurs through the Site Plan Review process, except as expressly modified by the Hanford Place Development Master Plan.

2. The amendment would not be detrimental to the public health, safety, or welfare of the community.

Analysis: That this application has been reviewed by County departments, utility companies, City Fire Department, City Building Department, and other involved departments. Any mitigation required for public health and safety were applied to the proposal and required in the mitigation monitoring and reporting program.

3. The amendment would maintain the appropriate balance of land uses within the City;

Analysis: That jobs-housing balance is achieved by increasing opportunities for people to work and live in close proximity. The ratio is expressed as the number of jobs divided by the number of housing units. The jobs-housing balance is a general tool for analyzing where people work, where they live, and how effectively they can travel between the two. In the planning area, the jobs-housing balance ratio in 2013-2014 was 1.17. It is estimated that the implementation of the General Plan would increase the jobs-housing balance by 0.45 to 1.62, which would make the planning area a jobs-rich area. The proposal to change the designation from Highway Commercial to a combination of Service Commercial and High-Density Residential will impact the job-housing balance projected by increasing the number of residential units in the area. The addition of the residential units to the formerly commercial designation will not affect the City's ability to maintain an appropriate balance of land uses within the City, as the increase in housing will bring more residential units to the jobs-rich planning area.

4. The anticipated land uses on the subject site would be compatible with existing and future surrounding uses.

Analysis: That the Hanford Place Master Plan proposes the development of a medical and mixed-use development on property proposed to be zoned C-S Service Commercial and R-H High-Density Residential. The land uses within the Hanford Place development are compatible with the surrounding land uses and compatible with future surrounding lands uses.

| Direction | Existing Land Use                                                    | General Plan Designation                                | Zone District                                                             |
|-----------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|
| North     | Railroad; Adventist Health Medical Center; single-family residential | Office; Office Residential                              | O Office; O-R Office Residential                                          |
| South     | CA-198; car dealership; basin; single-family residential             | Highway Commercial, Open Space, Low-Density Residential | C-H Highway Commercial, PF Public Facility, R-L-5 Low-Density Residential |
| East      | Integrate shopping center – grocery, retail, gym, restaurant         | Regional Commercial                                     | C-R Regional Commercial                                                   |
| West      | Veterinary hospital, mini-storage, California Highway Patrol, hotel  | Highway Commercial                                      | C-H Highway Commercial                                                    |

The project will be developed in conformance with the C-S Service Commercial and R-H High-Density Residential zone district regulations, except where expressly modified by the Hanford Place Master Plan (PUD).

### **Rezone No. 2022-01**

In accordance with HMC Section 17.86.030, before a zone change may be approved, all of the following findings shall be made by the reviewing authority: *(Note: the required findings to support the rezone application are the same as the findings used to support the General Plan Amendment).*

1. That the amendment is internally consistent with the goals, objectives, and policies of the General Plan and the Municipal Code.

Analysis: That Rezone No. 2022-01 is internally consistent with the goals, objectives, and policies of the General Plan, specifically consistent with Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80. All regulations pertaining to C-S – Service Commercial and R-H High-Density Residential zone district will be enforced as development occurs through the Site Plan Review process, except as expressly modified by the Hanford Place Development Master Plan.

2. The amendment would not be detrimental to the public health, safety, or welfare of the community.

Analysis: That this application has been reviewed by County departments, utility companies, City Fire Department, City Building Department, and other involved departments. Any mitigation required for public health and safety were applied to the proposal and required in the mitigation monitoring and reporting program.

3. The amendment would maintain the appropriate balance of land uses within the City;

Analysis: That jobs-housing balance is achieved by increasing opportunities for people to work and live in close proximity. The ratio is expressed as the number of jobs divided by the number of housing units. The jobs-housing balance is a general tool for analyzing where people work, where they live, and how effectively they can travel between the two. In the planning area, the jobs-housing balance ratio in 2013-2014 was 1.17. It is estimated that the implementation of the General Plan would increase the jobs-housing balance by 0.45 to 1.62, which would make the planning area a jobs-rich area. The proposal to change the designation from Highway Commercial to a combination of Service Commercial and High-Density Residential will impact the job-housing balance projected by increasing the number of residential units in the area. The addition of the residential units to the formerly commercial designation will not affect the City's ability to maintain an appropriate balance of land uses within the city, as the increase in housing will bring more residential units to the jobs-rich planning area.

4. The anticipated land uses on the subject site would be compatible with existing and future surrounding uses.

Analysis: That the Hanford Place Master Plan proposes the development of a medical and mixed-use development on property proposed to be zoned C-S Service Commercial and R-H High-Density Residential. The land uses within the Hanford Place development are compatible with the surrounding land uses and compatible with future surrounding lands uses.

| Direction | Existing Land Use                                                    | General Plan Designation                                | Zone District                                                             |
|-----------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|
| North     | Railroad; Adventist Health Medical Center; single-family residential | Office; Office Residential                              | O Office; O-R Office Residential                                          |
| South     | CA-198; car dealership; basin; single-family residential             | Highway Commercial, Open Space, Low-Density Residential | C-H Highway Commercial, PF Public Facility, R-L-5 Low-Density Residential |
| East      | Integrate shopping center – grocery, retail, gym, restaurant         | Regional Commercial                                     | C-R Regional Commercial                                                   |
| West      | Veterinary hospital, mini-storage, California Highway Patrol, hotel  | Highway Commercial                                      | C-H Highway Commercial                                                    |

The project will be developed in conformance with the C-S Service Commercial and R-H High-Density Residential zone district regulations, except where expressly modified by the Hanford Place Master Plan (PUD).

#### **Planned Unit Development No. 2022-01 (Hanford Place Master Plan)**

In accordance with HMC Section 17.80.030, before a conditional use permit may be approved, all of the following findings shall be made by the reviewing authority:

Pursuant to Section 17.82.060 of the Hanford Municipal Code, six findings must be made before approval of the planned unit development application:

1. That the location and design of the planned unit development is in accordance with the purpose of this title.

**Analysis:** Location - That in accordance with Section 17.82.050 of the Hanford Municipal Code, a planned unit development shall be a minimum five-acre site area, except that there shall be no minimum site area requirements if the site is an infill development site. The planned unit development pertains to a 39.16-acre development, which exceeds the minimum site area for a planned unit development.

**Design and Purpose** - That planned unit developments are encouraged to achieve a more functional, aesthetically pleasing, and harmonious living and working environment within the City, that otherwise might not be possible by strict adherence to the provisions of the municipal code. In certain instances, the objectives of the municipal code may be achieved by development that does not conform in all respects with the land use pattern designated on the zoning map or in the zone district prescribed. The planned unit development seeks to:

- ✓ A. To permit a site within more than one (1) zone district to mix the permitted or conditionally permitted land uses of both zones within the site without regard to the zone district boundary.
- ✓ C. To permit the lot patterns on size, shape, and layout that would otherwise not be permitted by the standards of the zone district in which the site is located.

- ✓ D. To modify the required building setbacks, distances between structures, and landscaped areas that would otherwise be required by this title.
- ✓ E. To reduce the amount of required parking spaces when spaces are shared among multiple land uses.

The design of Planned Unit Development No. 2022-01 is consistent with the objectives of Section 17.82.

2. That the planned unit development is being proposed to achieve one or more of the objectives identified in Section 17.82.030.

**Analysis:** That the planned unit development is requested, in order to achieve the following objectives identified in Section 17.82.030:

- ✓ A. To permit a site within more than one (1) zone district to mix the permitted or conditionally permitted land uses of both zones within the site without regard to the zone district boundary.
- ✓ C. To permit the lot patterns on size, shape, and layout that would otherwise not be permitted by the standards of the zone district in which the site is located.
- ✓ D. To modify the required building setbacks, distances between structures, and landscaped areas that would otherwise be required by this title.
- ✓ E. To reduce the amount of required parking spaces when spaces are shared among multiple land uses.

The design of Planned Unit Development No. 2022-01 is consistent with the objectives of Section 17.82.

3. That the location and design of the planned unit development and the conditions under which it would be operated or maintained will not be detrimental to the public health, safety, or welfare of the community to properties or improvements in the vicinity.

**Analysis:** Location - That in accordance with Section 17.82.050 of the Hanford Municipal Code, a planned unit development shall be a minimum five-acre site area, except that there shall be no minimum site area requirements if the site is an infill development site. The planned unit development pertains to a 39.16-acre development, which exceeds the minimum site area for a planned unit development.

Design and Purpose - That planned unit developments are encouraged to achieve a more functional, aesthetically pleasing, and harmonious living and working environment within the City, that otherwise might not be possible by strict adherence to the provisions of the municipal code. In certain instances, the objectives of the municipal code may be achieved by development that does not conform in all respects with the land use pattern designated on the zoning map or in the zone district prescribed. The planned unit development seeks to:

- ✓ A. To permit a site within more than one (1) zone district to mix the permitted or conditionally permitted land uses of both zones within the site without regard to the zone district boundary.
- ✓ C. To permit the lot patterns on size, shape, and layout that would otherwise not be permitted by the standards of the zone district in which the site is located.
- ✓ D. To modify the required building setbacks, distances between structures, and landscaped areas that would otherwise be required by this title.
- ✓ E. To reduce the amount of required parking spaces when spaces are shared among multiple land uses.

Conditions of Operation – The Hanford Place Master Plan will function, as described in the Master Plan (**Attachment 1**).

Main objectives of the Master Plan include:

#### Zoning and Allowed Uses

Through the Planned Unit Development, the following uses shall be allowed by right. This would apply to all locations on the site and would not be limited by the conceptual site plan:

- All uses listed as permitted or conditionally permitted in the R-H High Density Residential Zone
- All uses listed as permitted or conditionally permitted in the C-S Service Commercial Zone
- Assisted living, skilled nursing, hospice.
- College/university satellite campus
- Hotel
- Residence in the same building as a commercial or office use
- Urgent care clinic

The overall intensity of the total site would be limited by the intensity analyzed in the CEQA document. A higher intensity than that would require an amendment to the PUD. Land use locations are flexible and may change from the conceptual plan. The roadway alignments and ponding basin location would not change.

The included conceptual layout for the site has been prepared by Langdon Wilson Intl. Architecture. Individual sites may be developed independently of the Master Plan, allowing for building size, placement, and use to vary from the character in the illustrations.

Revised layout plans would be followed up with specific site plans and parcel maps that would create the public right-of-way.

#### Design Conditions

In order for Hanford Place to have a consistent theme and to operate as a cohesive group of uses, the following design conditions are incorporated into the PUD:

1. Establish that cross-access and shared parking agreements are required for adjacent parcels as they are created prior to, or in conjunction with, parcel map or lot line adjustment approval.
2. Landscaping and lighting design shall be consistent between the sites in the PUD plan area.
3. Uses are not required to obey the zone boundary in the PUD plan area. Uses within the PUD plan area can be from either of the zones within the PUD plan area.
4. A block wall is not required within the PUD plan area between the zones.
5. Additional building setbacks are not required between the two zones within the PUD plan area. The C-S zone required setbacks shall apply to the entire PUD plan area.
6. The maximum building height for the PUD area shall be permit the C-S zone, which is 50 feet.
7. Buildings within the PUD plan area shall have a uniform/cohesive design type, with the exception of standalone residential or hotel buildings, which are not required to have similar design, but shall have compatible colors and design elements. Elevation plans shall be submitted with site plans to confirm compliance. Standards shall be set by the first development in the PUD plan area for succeeding developments.
8. The number of on-site parking spaces shall be as follows:
  - a. Motel or hotel – 1 space per guest room plus 1 space per employee
  - b. Assisted living, skilled nursing facility, or hospice – 1 space for every 4 beds.
  - c. c. multifamily dwellings - at least 50% of spaces shall be covered.
    - ii. one-bedroom - 1.5 spaces per dwelling unit
    - iii. two-bedroom - 1.75 spaces per dwelling unit
    - iv. three or more bedrooms - 2 spaces per dwelling unit
  - d. d. all other allowed uses - 1 space per 350 square feet of building space.
9. A sign program shall be established prior to building permit approval for the first office or commercial use. The sign program would not apply to residential, and hotel/motel uses, which would follow sign standards in the Zoning Ordinance.

All development will be reviewed during the Site Plan Review process when physical development is proposed.

4. That the location and design of the planned unit development will not generate more traffic than the streets in the vicinity can carry without congestion and will not overload utilities.

**Analysis:** The project has been reviewed in an initial study, for which a traffic impact study (TIS) was conducted.

The study area for the TIS included the following study intersections and roadway segments.

Intersections

1. 12th Avenue/Glendale Avenue
2. 12th Avenue/SR-198 westbound (WB) Ramps
3. 12th Avenue/SR-198 eastbound (EB) Ramps
4. Campus Drive/Lacey Boulevard
5. Campus Drive/7th Street
6. Campus Drive/6th Street
7. 11th Avenue/Lacey Boulevard
8. 11th Avenue /7th Street
9. 11th Avenue/6th Street
10. 11th Avenue/5th Street
11. 11th Avenue/4th Street-SR-198 WB On Ramp
12. 11th Avenue/3rd Street-SR-198 EB Off Ramp

Segments

1. Lacey Boulevard
  - 12th Avenue to Campus Drive
  - Campus Drive to 11th Avenue
  - 7th Street
  - Campus Drive to 11th Avenue
2. 6th Street
  - Campus Drive to 11th Avenue
3. Glendale Avenue
  - East of 12th Avenue
4. 5th Avenue
  - West of 11th Avenue
- E. Campus Drive
  - Lacey Boulevard to Glendale Avenue

The TIS includes the LOS analysis for the following traffic scenarios:

- Existing Conditions
- Existing Plus Project
- Near-Term Plus Project
- Cumulative Year 2042 Without Project
- Cumulative Year 2042 Plus Project

The TIS concluded that the impact on traffic would be less than significant.

5. That the planned unit development's population density, site area and dimensions, site coverage, yard spaces, height of structures, distances between structures, off-street parking and off-street loading facilities, landscaped areas and street design will produce an environment of stable and desired character consistent with the purpose of this title.

**Analysis:** That the project has been evaluated for consistency with the requirements of Section 17.14 High-Density Residential zone district and 17.20 C-S Service Commercial zone district. All requirements for density, site area, dimensions, site coverage, open space, height of structures, distance between structures, off-street parking and loading facilities, and landscaped areas have been satisfied, except where expressly modified by the Hanford Place Master Plan (PUD 2022-01). The modifications proposed through the Hanford Place Master Plan will produce a cohesive design and an environment of stable and desired character consistent with the purpose of this title. The implementation of medical and mixed-use developments achieves several goals and policies of the General Plan, specifically Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80.

6. That the combination of different dwelling types, architectural appearance, and/or varieties of land uses in the development will complement each other and harmonize with the existing and proposed land uses in the vicinity.

**Analysis:** The Hanford Place Master Plan proposes a medical and mixed-use development on an underutilized, infill parcel, proposed to be designated as C-S Service Commercial and R-H High-Density Residential. Through cohesive design, comprehensive design criteria, and medical-focused uses, with supportive residential, educational, and commercial uses, the Planned Unit Development proposes a design and combination of uses that will complement and harmonize across the zone districts proposed and achieve a goal of the General Plan to promote horizontal mixed-use development. The implementation of medical and mixed-use developments achieves several goals and policies of the General Plan, specifically Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80.

## CONSULTATION

### Early Consultation

Early consultation to agencies outside of the City of Hanford (pursuant to CEQA Guidelines Section 15082) was conducted for the project.

Early consultation was received from:

- Pacific Gas and Electric Company – November 3, 2022 (Reflecting no comments) – **Attachment 3.**
- San Joaquin Valley Air Pollution Control District – November 8, 2022 – **Attachment 4.**
- Santa Rosa Rancheria Tachi-Yokut Tribe – November 9, 2022 – **Attachment 5.**

Early consultation letters are included and analyzed in the initial study.

### Consultation

In accordance with Section 15073 of the California Environmental Quality Act Guidelines, a Notice of Intent to Adopt a Mitigated Negative Declaration was sent to the concerned agencies, mailed to residents within 300 feet of the project site, and posted on CEQANet on July 6, 2023, for a 30-day review period. No comments have been received as of the date of preparation of this report.

## ENVIRONMENTAL ASSESSMENT



Mitigated Negative Declaration No. 2023-93 (SCH Number 2023070011) is recommended for the project based on the following: In accordance with the California Environmental Quality Act (CEQA), General Plan Amendment No. 2022-01, Rezone No. 2022-01, and Planned Unit Development No. 2022-01 were evaluated in an Environmental Assessment/Initial Study. Based on the review, it was determined that the proposed project would not result in a significant adverse impact on the environment with the incorporation of mitigation measures, therefore Mitigated Negative Declaration No. 2023-93 has been prepared, attached as **Attachment 2**.

## **PUBLIC COMMENTS**

Notice of Public Hearing for the proposed projects was published in the Hanford Sentinel, posted on the Office of Planning and Research (OPR) CEQANet website, and mailed to property owners within 300 ft. of the project site on July 6, 2023. The Community Development Department has not received comments on the projects as of the date of preparation of this report.

## **STAFF RECOMMENDATION**

1. Recommend certification of Mitigated Negative Declaration No. 2023-93 for the project to the City Council.
2. Adopt Resolution No. 2023-23, recommending approval of General Plan Amendment No. 2022-01 to the City Council.
3. Adopt Resolution No. 2023-24, recommending approval Rezone No. 2022-01 to the City Council.
4. Adopt Resolution No. 2023-25, recommending approval of Planned Unit Development No. 2022-01 to the City Council

## RESOLUTION NO. 2023-23

**A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF HANFORD RECOMMENDING APPROVAL OF GENERAL PLAN AMENDMENT NO. 2022-01 TO THE CITY COUNCIL. GENERAL PLAN AMENDMENT NO. 2022-01: A REQUEST TO CHANGE THE GENERAL PLAN DESIGNATION ON 39.16 ACRES FROM HIGHWAY COMMERCIAL TO A COMBINATION SERVICE COMMERCIAL AND HIGH-DENSITY RESIDENTIAL. THE PROJECT IS LOCATED BETWEEN 11<sup>TH</sup> AND 12<sup>TH</sup> AVENUES ALONG GLENDALE DRIVE, NORTH OF HIGHWAY 198 (APN 011-060-007, 011-060-008, 012-290-042, AND 012-290-054).**

At a regular meeting of the Planning Commission of the City of Hanford duly called and held on August 8, 2023, on motion of Commissioner \_\_\_\_\_, seconded by Commissioner \_\_\_\_\_, and duly carried, the following resolution was adopted:

**WHEREAS**, an application, filed by Steve Brandt – QK, for General Plan Amendment No. 2022-01 requesting a General Plan Amendment to change the General Plan land use designation from Highway Commercial to a combination of Service Commercial and High-Density Residential on approximately 39.16 acres, as shown in **Exhibit A**, was presented to the Hanford City Planning Commission on August 8, 2023; and,

**WHEREAS**, the project is located at between 11<sup>th</sup> and 12<sup>th</sup> Avenues along Glendale Drive, north of Highway 198 (APN 011-060-007, 011-060-008, 012-290-042, and 012-290-054); and

**WHEREAS**, the City of Hanford Planning Commission considered the General Plan Amendment, in accordance with Section 17.88 of the Hanford Municipal Code, at its regularly scheduled meeting on August 8, 2023; and,

**WHEREAS**, the City of Hanford Planning Commission considered the evidence presented in the staff report and testimony presented during the public hearing; and

**WHEREAS**, the Initial Study, Mitigated Negative Declaration No. 2023-93, and all notices related thereto were prepared in compliance with the California Environmental Quality Act (CEQA) and the City of Hanford Municipal Code and Policies; and

**NOW THEREFORE, BE IT RESOLVED**, that the Planning Commission hereby recommends that the City Council of the City of Hanford find that no significant environmental impacts would result from the proposed project with the incorporation of mitigation measures, adopt a Mitigation and Monitoring Reporting Program, attached as **Exhibit B**, and certify that Mitigated Negative Declaration No. 2023-93 was prepared consistent with CEQA and City of Hanford Environmental Guidelines.

**NOW THEREFORE BE IT FURTHER RESOLVED**, that the City of Hanford Planning Commission, in accordance with Section 17.88.040 of the Hanford Municipal Code, recommends approval to the City Council of General Plan Amendment No. 2022-01, based upon the following findings and on the evidence presented:

1. That the amendment is internally consistent with the goals, objectives, and policies of the General Plan and the Municipal Code.

Analysis: That Rezone No. 2022-01 is internally consistent with the goals, objectives, and policies of the General Plan, specifically consistent with Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80. All regulations pertaining to C-S – Service Commercial and R-H High-Density Residential zone district will be enforced as development occurs through the Site Plan Review process, except as expressly modified by the Hanford Place Development Master Plan.

2. The amendment would not be detrimental to the public health, safety, or welfare of the community.

Analysis: That this application has been reviewed by County departments, utility companies, City Fire Department, City Building Department, and other involved departments. Any mitigation required for public health and safety were applied to the proposal and required in the mitigation monitoring and reporting program.

3. The amendment would maintain the appropriate balance of land uses within the City;

Analysis: That jobs-housing balance is achieved by increasing opportunities for people to work and live in close proximity. The ratio is expressed as the number of jobs divided by the number of housing units. The jobs-housing balance is a general tool for analyzing where people work, where they live, and how effectively they can travel between the two. In the planning area, the jobs-housing balance ratio in 2013-2014 was 1.17. It is estimated that the implementation of the General Plan would increase the jobs-housing balance by 0.45 to 1.62, which would make the planning area a jobs-rich area. The proposal to change the designation from Highway Commercial to a combination of Service Commercial and High-Density Residential will impact the job-housing balance projected by increasing the number of residential units in the area. The addition of the residential units to the formerly commercial designation will not affect the City's ability to maintain an appropriate balance of land uses within the City, as the increase in housing will bring more residential units to the jobs-rich planning area.

4. The anticipated land uses on the subject site would be compatible with existing and future surrounding uses.

Analysis: That the Hanford Place Master Plan proposes the development of a medical and mixed-use development on property proposed to be zoned C-S Service Commercial and R-H High-Density Residential. The land uses within the Hanford Place development are compatible with the surrounding land uses and compatible with future surrounding lands uses.

| Direction | Existing Land Use                                                    | General Plan Designation                                | Zone District                                                             |
|-----------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|
| North     | Railroad; Adventist Health Medical Center; single-family residential | Office; Office Residential                              | O Office; O-R Office Residential                                          |
| South     | CA-198; car dealership; basin; single-family residential             | Highway Commercial, Open Space, Low-Density Residential | C-H Highway Commercial, PF Public Facility, R-L-5 Low-Density Residential |
| East      | Integrate shopping center – grocery, retail, gym, restaurant         | Regional Commercial                                     | C-R Regional Commercial                                                   |

|      |                                                                        |                    |                        |
|------|------------------------------------------------------------------------|--------------------|------------------------|
| West | Veterinary hospital, mini-storage,<br>California Highway Patrol, hotel | Highway Commercial | C-H Highway Commercial |
|------|------------------------------------------------------------------------|--------------------|------------------------|

The project will be developed in conformance with the C-S Service Commercial and R-H High-Density Residential zone district regulations, except where expressly modified by the Hanford Place Master Plan (PUD 2022-01).

**PASSED AND ADOPTED** at a regular meeting of the Hanford City Planning Commission by the following votes:

AYES: Commissioners  
 NOES: Commissioners  
 ABSTAIN: Commissioners  
 ABSENT: Commissioners

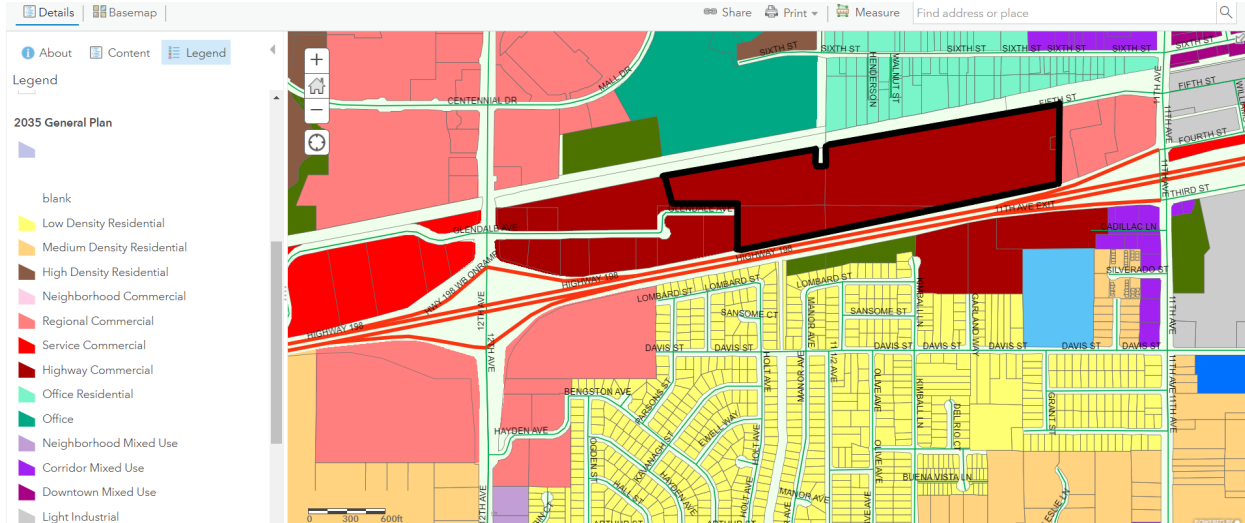
STATE OF CALIFORNIA )  
 COUNTY OF KINGS )ss.  
 CITY OF HANFORD )

I, **Jason Waters**, Secretary of the City of Hanford Planning Commission, do hereby certify the foregoing resolution was duly passed and adopted by the Planning Commission of the City of Hanford at a regular meeting thereof held on the 8<sup>th</sup> day of August, 2023.

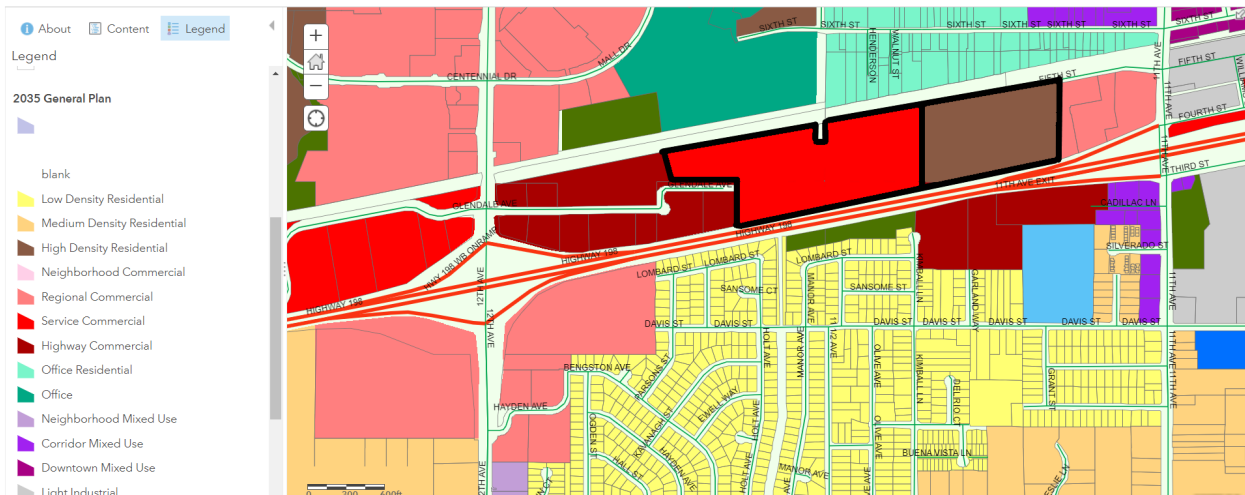
Jason Waters, Secretary

**Exhibit A**  
Current and Proposed General Plan Land Use Designation

**Existing General Plan Designation  
Highway Commercial**



**Figure 8: Proposed General Plan Designation  
Service Commercial and High-Density Residential**



**Exhibit B**  
Mitigation Monitoring and Reporting Program

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Biological Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Mitigation Measure BIO-1</b> Conduct Preconstruction Clearance Surveys for San Joaquin Kit Fox and Burrowing Owl. A preconstruction clearance survey is required for San Joaquin kit fox and burrowing owl no more than 30 calendar days prior to initiation of project activities. All survey results must be delivered to the United States Fish and Wildlife Service's (USFWS), the California Department of Fish and Wildlife (CDFW), and the City. If the survey results find an active burrow of one or both of these species on the project site, the applicant must coordinate with the applicable resource agencies (CDFW for burrowing owl, CDFW and USFWS for kit fox) to obtain applicable agency approval(s)/permit(s) prior to any ground disturbance activities on the site.</p> <p>Specific avoidance, den excavation, passive relocation, and compensatory mitigation activities shall be performed as required by the applicable agency. Appropriate provisions of the CDFW Staff Report on Burrowing Owl Mitigation and USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox shall be adhered to.</p> |
| <p><b>Mitigation Measure BIO-2</b> Worker Environmental Awareness Training. Prior to initial groundbreaking, Worker Environmental Awareness Training shall be conducted by a qualified biologist to educate all construction personnel on the relevant federal, state, and local laws related to potentially occurring special-status species at the site. The tailgate session shall include training on identification of species that may be found on the project site, the status of those species, and any legal protection afforded to those species. Personnel will be advised to report any special-status species encountered promptly. A fact sheet conveying this information will be prepared for display or for distribution to anyone who may enter the project site.</p>                                                                                                                                                                                                                                                                                                                                                                           |
| <p><b>Mitigation Measure BIO-3</b> Construction Site Housekeeping and Operational Requirements. Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities shall be minimized by adhering to the following USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox:</p> <p>a) To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas shall also be included in preconstruction surveys and, to the extent possible, shall be established in locations disturbed by previous activities to prevent further impacts.</p>                                                                                                                                                                                                                                                                                                                                                                                                         |

b) Project-related vehicles shall observe a daytime speed limit of 20-mph throughout the site in all project sites, except on county roads and state and federal highways; this is particularly important at night when kit foxes are most active. Night-time construction shall be minimized to the extent possible. However, if it does occur, then the speed limit shall be reduced to 10-mph. Off-road traffic outside of designated project sites shall be prohibited.

c) To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steepwalled holes or trenches more than 2-feet deep shall be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the USFWS and the CDFW shall be contacted.

d) Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW have been consulted. If necessary, and under the direct supervision of a qualified biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped. In the case of trapped animals, escape ramps or structures shall be installed immediately to allow the animal(s) to escape, or the USFWS and CDFW should be contacted for further guidance.

e) All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from a construction or project site.

f) Pets, such as dogs or cats, shall not be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.

g) Use of rodenticides and herbicides in project sites shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

**Mitigation Measure BIO-4** Nesting Bird Surveys and Avoidance. If vegetation removal, construction, or grading activities are planned to occur within the active nesting bird season (February 15 through September 15), a qualified biologist shall conduct a preconstruction nesting bird survey no more than 5 days prior to the start of such activities. The nesting bird survey shall include the project site and areas immediately adjacent to the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust, etc. For any active nest(s) identified, the qualified biologist shall establish an appropriate buffer zone around the active nest(s). The appropriate buffer shall be determined by the qualified biologist based on species, location, and the nature of the proposed activities. Project activities shall be avoided within the buffer zone until the nest is deemed no longer active by the qualified biologist.



**Mitigation Measure BIO-5** Agency Coordination for Peoples Ditch. Prior to any modifications to Peoples Ditch, it is recommended to consult with the United States Army Corps of Engineers (USACE), CDFW, and Regional Water Quality Control Board (RWQCB) to verify the feature's jurisdictional status and obtain applicable permit(s) and/or authorization(s). A notification of streambed alteration should be submitted to the CDFW in accordance with Section 1602 of the California Fish and Game Code. Unless categorically excluded under effective definitions or existing documentation confirms that no permit is needed, the Central Valley RWQCB and Sacramento District of the USACE should be consulted regarding potential permitting needs under the California Water Code and federal Clean Water Act, respectively, associated with the proposed Peoples Ditch modifications.

## **Cultural Resources**

### *Will the project:*

Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Disturb any human remains, including those interred outside of formal cemeteries?

## **Mitigation Measures**

**Mitigation Measure CULT-1** Because of the very high sensitivity of the soil type in the project area, the possibility exists that buried archaeological deposits within the project site. Therefore, archaeological monitoring must be conducted during ground-disturbing construction activities in native soil, including clearing and grubbing. Monitoring should occur on a full-time basis during all excavation activities until the Project Archaeologist, based on the archaeological monitor's observations, is satisfied that there is little likelihood of encountering intact archaeological deposits. The Project Archaeologist may also determine it is appropriate to reduce monitoring to spot-checking or on a part-time basis. Upon completion of the monitoring and, if necessary, mitigation, the archaeologist should prepare a report to document the methods and results of the monitoring. The final report should be submitted to the SSJVIC.

**Mitigation Measure CULT-2** Additional mapping and subsurface testing of AE-4167-01 shall be conducted to evaluate its eligibility for inclusion in the California Register of Historical Resources, pursuant to California Public Resources Code (PRC) 5024.1. Additional focused subsurface testing in areas not previously disturbed by historic-era activities must be conducted to confirm presence/absence of high-sensitivity paleosols that may include intact prehistoric cultural deposits. If intact prehistoric cultural deposits are encountered during subsurface presence/absence testing, further investigation must be conducted to determine if the deposit retains integrity and is eligible for inclusion in the California Register of Historical Resources. The methods and findings of the additional studies would be presented as an addendum to the Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project and would include cultural resource management recommendations to guide mitigation of potential adverse effects to any identified historical resources within the project area.

**Mitigation Measure CULT-3** Any human remains encountered during project-related ground disturbing activities shall be treated in accordance with California Health and Safety Code Section 7050.5. The project sponsor shall inform all contractor(s) performing excavation of the sensitivity of the project site for human remains and include the following directive in the appropriate contract documents: If human remains are uncovered, all work within 50 feet of the discovery shall be halted and the Kings County Coroner notified immediately. At the same time, the on-site monitoring archaeologist shall assess the situation and consult with agencies as appropriate.

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| Project personnel shall not collect or move any human remains or associated materials. If the human remains are of Native American origin, the Coroner must notify the California State Native American Heritage Commission (NAHC) within 24 hours of this identification. The NAHC will formally identify a Native American Most Likely Descendant (MLD)—if one is not already on-site—to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods. Such recommendations shall be carried out to the satisfaction of the NAHC prior to work resuming within 50 feet of the discovered remains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Mitigation Measure CULT-4</b> A Burial Treatment Plan shall be entered into by the project applicant/property owner prior to any ground disturbing activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Geology and Soils</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| b. Result in substantial soil erosion or the loss of topsoil?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| f. Directly or indirectly destroy a unique paleontological                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GEO-1</b> To reduce the potential for soil erosion during construction of the proposed project, an Erosion Control Plan shall be prepared for the project in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity, prior to the start of grading.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GEO-2</b> The project applicant shall inform its contractor(s) of the sensitivity of the project area for paleontological resources. Should paleontological resources be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. If found to be significant, and project activities cannot avoid the paleontological resources, adverse effects to paleontological resources shall be mitigated. Mitigation may include monitoring, recording the fossil locality, data recovery and analysis, a final report, and accessioning the fossil material and technical report to a paleontological repository. Public educational outreach may also be appropriate. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared and submitted to the City for review, and (if paleontological materials are recovered) a paleontological repository, such as the University of California Museum of Paleontology (UCMP). The City shall verify that the above directive has been included in the appropriate contract documents. |
| <b>Greenhouse Gas Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GHG-1</b> In order to meet the 2022 Scoping Plan greenhouse gas (GHG) requirements, consistent with State GHG reduction and equity prioritization goals, the proposed project shall provide electric vehicle charging capabilities that meet the most ambitious voluntary standard in the California Green Building Standards Code at the time of project approval as part of the final project design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hydrology and Water Quality</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:</p> <ul style="list-style-type: none"> <li>i. Result in substantial erosion or siltation on- or off-site;</li> <li>ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite</li> <li>iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or</li> <li>iv. Impede or redirect flood flows?</li> </ul>           |
| <p>e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Mitigation Measures</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>Mitigation Measure HYDRO-1</b> To minimize any potential short-term water quality effects from project-related construction activities, the project contractor shall implement Best Management Practices (BMPs) in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity. In addition, the proposed project shall be in compliance with existing regulatory requirements, including the Water Pollution Control Preparation (WPCP) Manual. In addition, implementation of a Storm Water Pollution Prevention Plan (SWPPP) would be required under the National Pollutant Discharge Elimination System (NPDES) to regulate water quality associated with construction activities.</p> |
| <p><b>Mitigation Measure HYDRO-2</b> To reduce the potential for degradation of surface water quality during project operation, a Storm Water Management Plan (SWMP) shall be prepared for the proposed project. The SWMP shall describe specific programs to minimize storm water pollution resulting from the proposed project. Specifically, the SWMP shall identify and describe source control measures, treatment controls, and BMP maintenance requirements to ensure that the project complies with post-construction storm water management requirements of the Regional Water Quality Control Board (RWQCB).</p>                                                                                                                   |
| <p><b>Noise</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><i>Will the Project?</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>a. Cause generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Mitigation Measure</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Mitigation Measure NOI-1 Truck Movements.</b> All truck movements occurring during nighttime hours of 10:00 p.m. to 7:00 a.m. shall be required to use the Glendale Avenue access point only.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Mitigation Measure NOI-2** The project contractor shall implement the following measures during construction of the project:

- Per the City of Hanford Municipal Code, construction activities should not occur outside the hours of 7:00 a.m. to 8:00 p.m.
- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.
- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.
- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing the contact phone number of a designated noise disturbance coordinator.

**Mitigation Measure NOI-3 Exterior Noise Levels.** The final design shall include a minimum 6.5- foot above-ground level sound wall around outdoor activity areas associated with the proposed hotel and apartment land uses to mitigate exterior noise levels to below 65 dB Ldn within these outdoor activity areas.

**Mitigation Measure NOI-4 Interior Noise Levels.** Once building-specific construction plans become available, interior noise levels should be reviewed and calculated by a qualified acoustical consultant to determine if additional noise attenuation mitigation measures are required to comply with interior noise level standards.

#### **Tribal Cultural Resources**

*Will the project:*

a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

- i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?  
Or
- ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

#### **Mitigation Measures**

See Mitigation Measures CULT-1 through CULT-4,

#### **Utilities and Service System**

*Will the project:*

Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

| Mitigation Measures            |
|--------------------------------|
| See Mitigation Measure HYDRO-1 |

## RESOLUTION NO. 2023-24

**A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF HANFORD RECOMMENDING APPROVAL OF REZONE NO. 2022-01 TO THE CITY COUNCIL. REZONE NO. 2022-01 IS A REQUEST TO CHANGE THE ZONING DESIGNATION C-H HIGHWAY COMMERCIAL TO A COMBINATION OF C-S SERVICE COMMERCIAL AND R-H HIGH-DENSITY RESIDENTIAL ON 39.16 ACRES. THE PROJECT IS LOCATED BETWEEN 11<sup>TH</sup> AND 12<sup>TH</sup> AVENUES ALONG GLENDALE DRIVE, NORTH OF HIGHWAY 198 (APN 011-060-007, 011-060-008, 012-290-042, AND 012-290-054).**

At a regular meeting of the Planning Commission of the City of Hanford duly called and held on August 8, 2023, on motion of Commissioner \_\_\_\_\_, seconded by Commissioner \_\_\_\_\_, and duly carried, the following resolution was adopted:

**WHEREAS**, an application, filed by Steve Brandt of QK for Rezone No. 2022-01, : a request to change the zoning on 39.16 acres from C-H Highway Commercial to C-S Service Commercial and R-H High-Density Residential with a Planned Unit Development overlay, as shown in **Exhibit A**, was presented to the Hanford City Planning Commission on August 8, 2023 and,

**WHEREAS**, the City of Hanford Planning Commission considered the Rezone, in accordance with Section 17.86 of the Hanford Municipal Code, at its regularly scheduled meeting on August 8, 2023; and,

**WHEREAS**, the City of Hanford Planning Commission considered the evidence presented in the staff report and testimony presented during the public hearing; and

**WHEREAS**, the Initial Study, Mitigated Negative Declaration No. 2023-93, and all notices related thereto were prepared in compliance with the California Environmental Quality Act (CEQA) and the City of Hanford Municipal Code and Policies; and

**NOW THEREFORE, BE IT RESOLVED**, that the Planning Commission hereby recommends that the City Council of the City of Hanford find that no significant environmental impacts would result from the proposed project with the incorporation of mitigation measures, adopt a Mitigation and Monitoring Reporting Program, attached as **Exhibit B**, and certify that Mitigated Negative Declaration No. 2023-93 was prepared consistent with CEQA and City of Hanford Environmental Guidelines.

**NOW THEREFORE BE IT FURTHER RESOLVED**, that the City of Hanford Planning Commission, in accordance with Section 17.86.030 of the Hanford Municipal Code, recommends approval to the City Council of Rezone No. 2022-01 based upon the following findings and on the evidence presented:

1. That the amendment is internally consistent with the goals, objectives, and policies of the General Plan and the Municipal Code.

Analysis: That Rezone No. 2022-01 is internally consistent with the goals, objectives, and policies of the General Plan, specifically consistent with Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80. All regulations pertaining to C-S – Service Commercial and R-H High-Density Residential zone district will be enforced as development

occurs through the Site Plan Review process, except as expressly modified by the Hanford Place Development Master Plan.

2. The amendment would not be detrimental to the public health, safety, or welfare of the community.

Analysis: That this application has been reviewed by County departments, utility companies, City Fire Department, City Building Department, and other involved departments. Any mitigation required for public health and safety were applied to the proposal and required in the mitigation monitoring and reporting program.

3. The amendment would maintain the appropriate balance of land uses within the City;

Analysis: That jobs-housing balance is achieved by increasing opportunities for people to work and live in close proximity. The ratio is expressed as the number of jobs divided by the number of housing units. The jobs-housing balance is a general tool for analyzing where people work, where they live, and how effectively they can travel between the two. In the planning area, the jobs-housing balance ratio in 2013-2014 was 1.17. It is estimated that the implementation of the General Plan would increase the jobs-housing balance by 0.45 to 1.62, which would make the planning area a jobs-rich area. The proposal to change the designation from Highway Commercial to a combination of Service Commercial and High-Density Residential will impact the job-housing balance projected by increasing the number of residential units in the area. The addition of the residential units to the formerly commercial designation will not affect the City's ability to maintain an appropriate balance of land uses within the City, as the increase in housing will bring more residential units to the jobs-rich planning area.

4. The anticipated land uses on the subject site would be compatible with existing and future surrounding uses.

Analysis: That the Hanford Place Master Plan proposes the development of a medical and mixed-use development on property proposed to be zoned C-S Service Commercial and R-H High-Density Residential. The land uses within the Hanford Place development are compatible with the surrounding land uses and compatible with future surrounding lands uses.

| Direction | Existing Land Use                                                    | General Plan Designation                                | Zone District                                                             |
|-----------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|
| North     | Railroad; Adventist Health Medical Center; single-family residential | Office; Office Residential                              | O Office; O-R Office Residential                                          |
| South     | CA-198; car dealership; basin; single-family residential             | Highway Commercial, Open Space, Low-Density Residential | C-H Highway Commercial, PF Public Facility, R-L-5 Low-Density Residential |
| East      | Integrate shopping center – grocery, retail, gym, restaurant         | Regional Commercial                                     | C-R Regional Commercial                                                   |
| West      | Veterinary hospital, mini-storage, California Highway Patrol, hotel  | Highway Commercial                                      | C-H Highway Commercial                                                    |

The project will be developed in conformance with the C-S Service Commercial and R-H High-Density Residential zone district regulations, except where expressly modified by the Hanford Place Master Plan (PUD).

**PASSED AND ADOPTED** at a regular meeting of the Hanford City Planning Commission by the following votes:

AYES: Commissioners  
NOES: Commissioners  
ABSTAIN: Commissioners  
ABSENT: Commissioners

STATE OF CALIFORNIA )  
COUNTY OF KINGS )ss.  
CITY OF HANFORD )

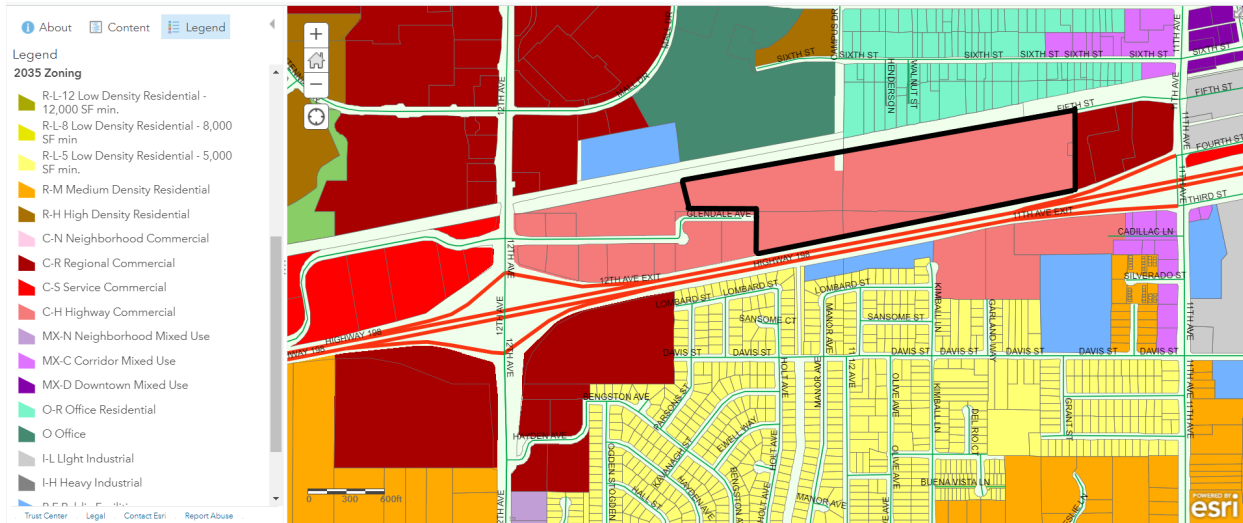
I, **Jason Waters**, Secretary of the City of Hanford Planning Commission, do hereby certify the foregoing resolution was duly passed and adopted by the Planning Commission of the City of Hanford at a regular meeting thereof held on the 8<sup>th</sup> day of August, 2023.

Jason Water, Secretary

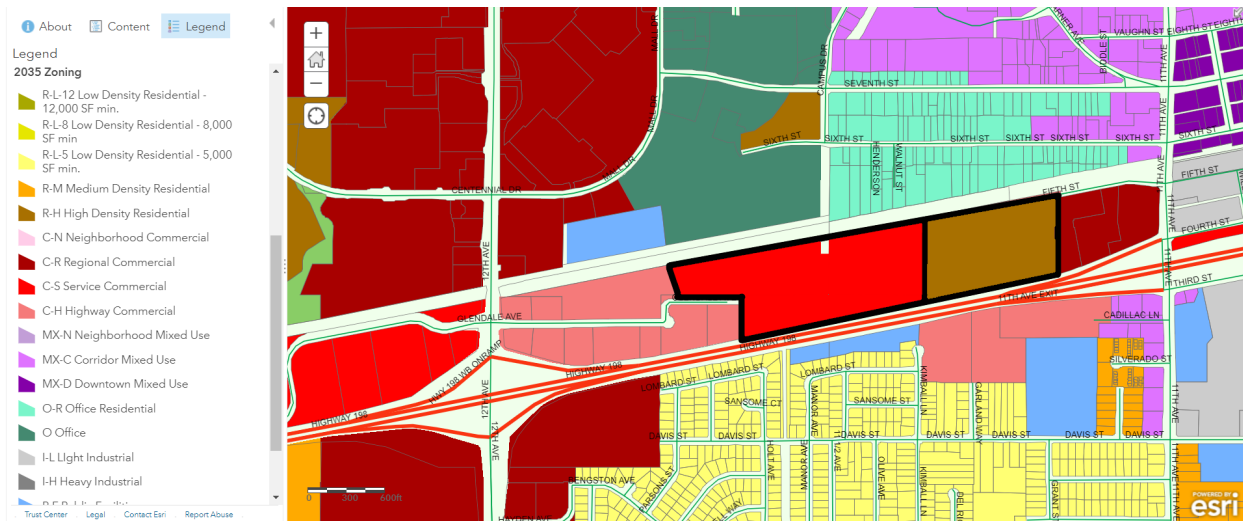


**Exhibit A**  
Current and Proposed Zone District

**Existing Zoning**  
**C-H Highway Commercial**



**Proposed Zoning**  
**C-S Service Commercial and R-H High-Density Residential**



**Exhibit B**  
Mitigation Monitoring and Reporting Program

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <b>Biological Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Mitigation Measure BIO-1</b> Conduct Preconstruction Clearance Surveys for San Joaquin Kit Fox and Burrowing Owl. A preconstruction clearance survey is required for San Joaquin kit fox and burrowing owl no more than 30 calendar days prior to initiation of project activities. All survey results must be delivered to the United States Fish and Wildlife Service's (USFWS), the California Department of Fish and Wildlife (CDFW), and the City. If the survey results find an active burrow of one or both of these species on the project site, the applicant must coordinate with the applicable resource agencies (CDFW for burrowing owl, CDFW and USFWS for kit fox) to obtain applicable agency approval(s)/permit(s) prior to any ground disturbance activities on the site.</p> <p>Specific avoidance, den excavation, passive relocation, and compensatory mitigation activities shall be performed as required by the applicable agency. Appropriate provisions of the CDFW Staff Report on Burrowing Owl Mitigation and USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox shall be adhered to.</p> |
| <p><b>Mitigation Measure BIO-2</b> Worker Environmental Awareness Training. Prior to initial groundbreaking, Worker Environmental Awareness Training shall be conducted by a qualified biologist to educate all construction personnel on the relevant federal, state, and local laws related to potentially occurring special-status species at the site. The tailgate session shall include training on identification of species that may be found on the project site, the status of those species, and any legal protection afforded to those species. Personnel will be advised to report any special-status species encountered promptly. A fact sheet conveying this information will be prepared for display or for distribution to anyone who may enter the project site.</p>                                                                                                                                                                                                                                                                                                                                                                           |
| <p><b>Mitigation Measure BIO-3</b> Construction Site Housekeeping and Operational Requirements. Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities shall be minimized by adhering to the following USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox:</p> <p>a) To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas shall also be included in preconstruction surveys and, to the extent possible, shall be established in locations disturbed by previous activities to prevent further impacts.</p>                                                                                                                                                                                                                                                                                                                                                                                                         |

b) Project-related vehicles shall observe a daytime speed limit of 20-mph throughout the site in all project sites, except on county roads and state and federal highways; this is particularly important at night when kit foxes are most active. Night-time construction shall be minimized to the extent possible. However, if it does occur, then the speed limit shall be reduced to 10-mph. Off-road traffic outside of designated project sites shall be prohibited.

c) To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steepwalled holes or trenches more than 2-feet deep shall be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the USFWS and the CDFW shall be contacted.

d) Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW have been consulted. If necessary, and under the direct supervision of a qualified biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped. In the case of trapped animals, escape ramps or structures shall be installed immediately to allow the animal(s) to escape, or the USFWS and CDFW should be contacted for further guidance.

e) All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from a construction or project site.

f) Pets, such as dogs or cats, shall not be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.

g) Use of rodenticides and herbicides in project sites shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

**Mitigation Measure BIO-4** Nesting Bird Surveys and Avoidance. If vegetation removal, construction, or grading activities are planned to occur within the active nesting bird season (February 15 through September 15), a qualified biologist shall conduct a preconstruction nesting bird survey no more than 5 days prior to the start of such activities. The nesting bird survey shall include the project site and areas immediately adjacent to the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust, etc. For any active nest(s) identified, the qualified biologist shall establish an appropriate buffer zone around the active nest(s). The appropriate buffer shall be determined by the qualified biologist based on species, location, and the nature of the proposed activities. Project activities shall be avoided within the buffer zone until the nest is deemed no longer active by the qualified biologist.

**Mitigation Measure BIO-5** Agency Coordination for Peoples Ditch. Prior to any modifications to Peoples Ditch, it is recommended to consult with the United States Army Corps of Engineers (USACE), CDFW, and Regional Water Quality Control Board (RWQCB) to verify the feature's jurisdictional status and obtain applicable permit(s) and/or authorization(s). A notification of streambed alteration should be submitted to the CDFW in accordance with Section 1602 of the California Fish and Game Code. Unless categorically excluded under effective definitions or existing documentation confirms that no permit is needed, the Central Valley RWQCB and Sacramento District of the USACE should be consulted regarding potential permitting needs under the California Water Code and federal Clean Water Act, respectively, associated with the proposed Peoples Ditch modifications.

## **Cultural Resources**

### *Will the project:*

Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Disturb any human remains, including those interred outside of formal cemeteries?

## **Mitigation Measures**

**Mitigation Measure CULT-1** Because of the very high sensitivity of the soil type in the project area, the possibility exists that buried archaeological deposits within the project site. Therefore, archaeological monitoring must be conducted during ground-disturbing construction activities in native soil, including clearing and grubbing. Monitoring should occur on a full-time basis during all excavation activities until the Project Archaeologist, based on the archaeological monitor's observations, is satisfied that there is little likelihood of encountering intact archaeological deposits. The Project Archaeologist may also determine it is appropriate to reduce monitoring to spot-checking or on a part-time basis. Upon completion of the monitoring and, if necessary, mitigation, the archaeologist should prepare a report to document the methods and results of the monitoring. The final report should be submitted to the SSJVIC.

**Mitigation Measure CULT-2** Additional mapping and subsurface testing of AE-4167-01 shall be conducted to evaluate its eligibility for inclusion in the California Register of Historical Resources, pursuant to California Public Resources Code (PRC) 5024.1. Additional focused subsurface testing in areas not previously disturbed by historic-era activities must be conducted to confirm presence/absence of high-sensitivity paleosols that may include intact prehistoric cultural deposits. If intact prehistoric cultural deposits are encountered during subsurface presence/absence testing, further investigation must be conducted to determine if the deposit retains integrity and is eligible for inclusion in the California Register of Historical Resources. The methods and findings of the additional studies would be presented as an addendum to the Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project and would include cultural resource management recommendations to guide mitigation of potential adverse effects to any identified historical resources within the project area.

**Mitigation Measure CULT-3** Any human remains encountered during project-related ground disturbing activities shall be treated in accordance with California Health and Safety Code Section 7050.5. The project sponsor shall inform all contractor(s) performing excavation of the sensitivity of the project site for human remains and include the following directive in the appropriate contract documents: If human remains are uncovered, all work within 50 feet of the discovery shall be halted and the Kings County Coroner notified immediately. At the same time, the on-site monitoring archaeologist shall assess the situation and consult with agencies as appropriate.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| Project personnel shall not collect or move any human remains or associated materials. If the human remains are of Native American origin, the Coroner must notify the California State Native American Heritage Commission (NAHC) within 24 hours of this identification. The NAHC will formally identify a Native American Most Likely Descendant (MLD)—if one is not already on-site—to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods. Such recommendations shall be carried out to the satisfaction of the NAHC prior to work resuming within 50 feet of the discovered remains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Mitigation Measure CULT-4</b> A Burial Treatment Plan shall be entered into by the project applicant/property owner prior to any ground disturbing activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Geology and Soils</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| b. Result in substantial soil erosion or the loss of topsoil?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| f. Directly or indirectly destroy a unique paleontological                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GEO-1</b> To reduce the potential for soil erosion during construction of the proposed project, an Erosion Control Plan shall be prepared for the project in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity, prior to the start of grading.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GEO-2</b> The project applicant shall inform its contractor(s) of the sensitivity of the project area for paleontological resources. Should paleontological resources be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. If found to be significant, and project activities cannot avoid the paleontological resources, adverse effects to paleontological resources shall be mitigated. Mitigation may include monitoring, recording the fossil locality, data recovery and analysis, a final report, and accessioning the fossil material and technical report to a paleontological repository. Public educational outreach may also be appropriate. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared and submitted to the City for review, and (if paleontological materials are recovered) a paleontological repository, such as the University of California Museum of Paleontology (UCMP). The City shall verify that the above directive has been included in the appropriate contract documents. |
| <b>Greenhouse Gas Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GHG-1</b> In order to meet the 2022 Scoping Plan greenhouse gas (GHG) requirements, consistent with State GHG reduction and equity prioritization goals, the proposed project shall provide electric vehicle charging capabilities that meet the most ambitious voluntary standard in the California Green Building Standards Code at the time of project approval as part of the final project design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hydrology and Water Quality</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:</p> <ul style="list-style-type: none"> <li>i. Result in substantial erosion or siltation on- or off-site;</li> <li>ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite</li> <li>iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or</li> <li>iv. Impede or redirect flood flows?</li> </ul>           |
| <p>e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Mitigation Measures</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>Mitigation Measure HYDRO-1</b> To minimize any potential short-term water quality effects from project-related construction activities, the project contractor shall implement Best Management Practices (BMPs) in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity. In addition, the proposed project shall be in compliance with existing regulatory requirements, including the Water Pollution Control Preparation (WPCP) Manual. In addition, implementation of a Storm Water Pollution Prevention Plan (SWPPP) would be required under the National Pollutant Discharge Elimination System (NPDES) to regulate water quality associated with construction activities.</p> |
| <p><b>Mitigation Measure HYDRO-2</b> To reduce the potential for degradation of surface water quality during project operation, a Storm Water Management Plan (SWMP) shall be prepared for the proposed project. The SWMP shall describe specific programs to minimize storm water pollution resulting from the proposed project. Specifically, the SWMP shall identify and describe source control measures, treatment controls, and BMP maintenance requirements to ensure that the project complies with post-construction storm water management requirements of the Regional Water Quality Control Board (RWQCB).</p>                                                                                                                   |
| <p><b>Noise</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><i>Will the Project?</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>a. Cause generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Mitigation Measure</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Mitigation Measure NOI-1 Truck Movements.</b> All truck movements occurring during nighttime hours of 10:00 p.m. to 7:00 a.m. shall be required to use the Glendale Avenue access point only.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Mitigation Measure NOI-2** The project contractor shall implement the following measures during construction of the project:

- Per the City of Hanford Municipal Code, construction activities should not occur outside the hours of 7:00 a.m. to 8:00 p.m.
- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.
- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.
- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing the contact phone number of a designated noise disturbance coordinator.

**Mitigation Measure NOI-3 Exterior Noise Levels.** The final design shall include a minimum 6.5- foot above-ground level sound wall around outdoor activity areas associated with the proposed hotel and apartment land uses to mitigate exterior noise levels to below 65 dB Ldn within these outdoor activity areas.

**Mitigation Measure NOI-4 Interior Noise Levels.** Once building-specific construction plans become available, interior noise levels should be reviewed and calculated by a qualified acoustical consultant to determine if additional noise attenuation mitigation measures are required to comply with interior noise level standards.

#### **Tribal Cultural Resources**

*Will the project:*

a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

- i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?  
Or
- ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

#### **Mitigation Measures**

See Mitigation Measures CULT-1 through CULT-4,

#### **Utilities and Service System**

*Will the project:*

Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?



| Mitigation Measures            |
|--------------------------------|
| See Mitigation Measure HYDRO-1 |

## RESOLUTION 2023-25

**A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF HANFORD PERTAINING TO PLANNED UNIT DEVELOPMENT NO. 2022-01, PLANNED UNIT DEVELOPMENT NO. 2022-01: A REQUEST TO ALLOW BLENDED ZONING FOR A MASTER PLANNED MEDICAL AND MIXED-USE DEVELOPMENT, INCLUDING THE FUTURE CONSTRUCTION OF 15 BUILDINGS CONSISTING OF MEDICAL OUTPATIENT CLINIC SERVICES, A HOTEL AND CONFERENCE CENTER, SPECIALIZED EDUCATION, RETAIL, MEDICAL OFFICE, SKILLED NURSING AND ASSISTED LIVING, AND MULTI-FAMILY RESIDENTIAL USES, AS WELL AS A BIO INFILTRATION BASIN, ASSOCIATED OPEN SPACE, CIRCULATION AND PARKING, AND INFRASTRUCTURE IMPROVEMENTS. THE PROJECT IS LOCATED BETWEEN 11TH AND 12TH AVENUES ALONG GLENDALE DRIVE, NORTH OF HIGHWAY 198 (APN 011-060-007, 011-060-008, 012-290-042, AND 012-290-054).**

At a regular meeting of the City of Hanford Planning Commission duly called and held on August 8, 2023 on motion of Commissioner \_\_\_\_\_, seconded by Commissioner \_\_\_\_\_, and duly carried, the following resolution was adopted:

**WHEREAS**, Planned Unit Development No. 2022-01, a request to allow blended zoning for a master planned medical and mixed-use development, including the future construction of 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements, as shown in **Exhibit A**, has been reviewed by the Planning Commission of the City of Hanford in accordance with Title 17.82 of the Hanford Municipal Code; and

**WHEREAS**, the project is located between 11<sup>th</sup> and 12<sup>th</sup> Avenues along Glendale Drive, north of Highway 198 (APN 011-060-007, 011-060-008, 012-290-042, and 012-290-054); and

**WHEREAS**, the various governmental department agencies, staff, and the Planning Commission have given careful consideration to this tentative subdivision map and have made recommendations thereon; and

**WHEREAS**, the Initial Study, Mitigated Negative Declaration No. 2023-93, and all notices related thereto were prepared in compliance with the California Environmental Quality Act (CEQA) and the City of Hanford Municipal Code and Policies; and

**NOW THEREFORE, BE IT RESOLVED**, that the Planning Commission hereby recommends that the City Council of the City of Hanford find that no significant environmental impacts would result from the proposed project with the incorporation of mitigation measures, adopt a Mitigation and Monitoring Reporting Program, attached as **Exhibit B**, and certify that Mitigated Negative Declaration No. 2023-93 was prepared consistent with CEQA and City of Hanford Environmental Guidelines.

**THEREFORE, BE IT RESOLVED**, on the basis of the facts and evidence provided in the staff report and the written and oral evidence presented at the public hearing, the Planning Commission hereby makes the following findings pursuant to Section 17.82.060 of the Hanford Municipal Code:

1. That the location and design of the planned unit development is in accordance with the purpose of this title.

**Analysis:** Location - That in accordance with Section 17.82.050 of the Hanford Municipal Code, a planned unit development shall be a minimum five-acre site area, except that there shall be no minimum site area requirements if the site is an infill development site. The planned unit development pertains to a 39.16-acre development, which exceeds the minimum site area for a planned unit development.

Design and Purpose - That planned unit developments are encouraged to achieve a more functional, aesthetically pleasing, and harmonious living and working environment within the City, that otherwise might not be possible by strict adherence to the provisions of the municipal code. In certain instances, the objectives of the municipal code may be achieved by development that does not conform in all respects with the land use pattern designated on the zoning map or in the zone district prescribed. The planned unit development seeks to:

- ✓ A. To permit a site within more than one (1) zone district to mix the permitted or conditionally permitted land uses of both zones within the site without regard to the zone district boundary.
- ✓ C. To permit the lot patterns on size, shape, and layout that would otherwise not be permitted by the standards of the zone district in which the site is located;
- ✓ D. To modify the required building setbacks, distances between structures, and landscaped areas that would otherwise be required by this title
- ✓ E. To reduce the amount of required parking spaces when spaces are shared among multiple land uses.

The design of Planned Unit Development No. 2022-01 is consistent with the objectives of Section 17.82.

2. That the planned unit development is being proposed to achieve one or more of the objectives identified in Section 17.82.030.

**Analysis:** That the planned unit development is requested, in order to achieve the following objectives identified in Section 17.82.030:

- ✓ A. To permit a site within more than one (1) zone district to mix the permitted or conditionally permitted land uses of both zones within the site without regard to the zone district boundary.
- ✓ C. To permit the lot patterns on size, shape, and layout that would otherwise not be permitted by the standards of the zone district in which the site is located;
- ✓ D. To modify the required building setbacks, distances between structures, and landscaped areas that would otherwise be required by this title
- ✓ E. To reduce the amount of required parking spaces when spaces are shared among multiple land uses.

The design of Planned Unit Development No. 2022-01 is consistent with the objectives of Section 17.82.

3. That the location and design of the planned unit development and the conditions under which it would be operated or maintained will not be detrimental to the public health, safety, or welfare of the community to properties or improvements in the vicinity.

**Analysis:** Location - That in accordance with Section 17.82.050 of the Hanford Municipal Code, a planned unit development shall be a minimum five-acre site area, except that there shall be no minimum site area requirements if the site is an infill development site. The planned unit development pertains to a 39.16-acre development, which exceeds the minimum site area for a planned unit development.

Design and Purpose - That planned unit developments are encouraged to achieve a more functional, aesthetically pleasing, and harmonious living and working environment within the City, that otherwise might not be possible by strict adherence to the provisions of the municipal code. In certain instances, the objectives of the municipal code may be achieved by development that does not conform in all respects with the land use pattern designated on the zoning map or in the zone district prescribed. The planned unit development seeks to:

- ✓ A. To permit a site within more than one (1) zone district to mix the permitted or conditionally permitted land uses of both zones within the site without regard to the zone district boundary.
- ✓ C. To permit the lot patterns on size, shape, and layout that would otherwise not be permitted by the standards of the zone district in which the site is located;
- ✓ D. To modify the required building setbacks, distances between structures, and landscaped areas that would otherwise be required by this title
- ✓ E. To reduce the amount of required parking spaces when spaces are shared among multiple land uses.

Conditions of Operation – The Hanford Place Master Plan will function, as described in the Master Plan (**Attachment 1**).

Main objectives of the Master Plan include:

#### Zoning and Allowed Uses

Through the Planned Unit Development, the following uses shall be allowed by right. This would apply to all locations on the site and would not be limited by the conceptual site plan:

- All uses listed as permitted or conditionally permitted in the R-H High Density Residential Zone
- All uses listed as permitted or conditionally permitted in the C-S Service Commercial Zone
- Assisted living, skilled nursing, hospice

- College/university satellite campus
- Hotel
- Residence in the same building as a commercial or office use
- Urgent care clinic

The overall intensity of the total site would be limited by the intensity analyzed in the CEQA document. A higher intensity than that would require an amendment to the PUD. Land use locations are flexible and may change from the conceptual plan. The roadway alignments and ponding basin location would not change.

The included conceptual layout for the site has been prepared by Langdon Wilson Intl. Architecture. Individual sites may be developed independently of the Master Plan, allowing for building size, placement, and use to vary from the character in the illustrations. Revised layout plans would be followed up with specific site plans and parcel maps that would create the public right-of-way

### Design Conditions

In order for Hanford Place to have a consistent theme and to operate as a cohesive group of uses, the following design conditions are incorporated into the PUD:

1. Establish that cross-access and shared parking agreements are required for adjacent parcels as they are created prior to, or in conjunction with, parcel map or lot line adjustment approval;
2. Landscaping and lighting design shall be consistent between the sites in the PUD plan area;
3. Uses are not required to obey the zone boundary in the PUD plan area. Uses within the PUD plan area can be from either of the zones within the PUD plan area;
4. A block wall is not required within the PUD plan area between the zones.
5. Additional building setbacks are not required between the two zones within the PUD plan area. The C-S zone required setbacks shall apply to the entire PUD plan area.
6. The maximum building height for the PUD area shall be permit the C-S zone, which is 50 feet.
7. Buildings within the PUD plan area shall have a uniform/cohesive design type, with the exception of standalone residential or hotel buildings, which are not required to have similar design, but shall have compatible colors ad design elements. Elevation plans shall be submitted with site plans to confirm compliance. Standards shall be set by the first development in the PUD plan are for succeeding developments.
8. The number of on-site parking spaces shall be as follows:
  - a. Motel or hotel – 1 space per guest room plus 1 space per employee
  - b. Assisted living, skilled nursing facility, or hospice – 1 space for every 4 beds

- c. c. multifamily dwellings - at least 50% of spaces shall be covered
    - ii. one-bedroom - 1.5 spaces per dwelling unit
    - iii. two-bedroom - 1.75 spaces per dwelling unit
    - iv. three or more bedrooms - 2 spaces per dwelling unit
  - d. d. all other allowed uses - 1 space per 350 square feet of building space
9. A sign program shall be established prior to building permit approval for the first office or commercial use. The sign program would not apply to residential and hotel/motel uses, which would follow sign standards in the Zoning Ordinance.

All development will be reviewed during the Site Plan Review process when physical development is proposed.

4. That the location and design of the planned unit development will not generate more traffic than the streets in the vicinity can carry without congestion and will not overload utilities.

**Analysis:** The project has been reviewed in an initial study, for which a traffic impact study (TIS) was conducted.

The study area for the TIS included the following study intersections and roadway segments.

#### Intersections

1. 12th Avenue/Glendale Avenue
2. 12th Avenue/SR-198 westbound (WB) Ramps
3. 12th Avenue/SR-198 eastbound (EB) Ramps
4. Campus Drive/Lacey Boulevard
5. Campus Drive/7th Street
6. Campus Drive/6th Street
7. 11th Avenue/Lacey Boulevard
8. 11th Avenue /7th Street
9. 11th Avenue/6th Street
10. 11th Avenue/5th Street
11. 11th Avenue/4th Street-SR-198 WB On Ramp
12. 11th Avenue/3rd Street-SR-198 EB Off Ramp

#### Segments

1. Lacey Boulevard
  - 12th Avenue to Campus Drive
  - Campus Drive to 11th Avenue
  - 7th Street
  - Campus Drive to 11th Avenue
2. 6th Street
  - Campus Drive to 11th Avenue
3. Glendale Avenue

- East of 12th Avenue
- 4. 5th Avenue
  - West of 11th Avenue
- B. Campus Drive
  - Lacey Boulevard to Glendale Avenue

The TIS includes the LOS analysis for the following traffic scenarios:

- Existing Conditions
- Existing Plus Project
- Near-Term Plus Project
- Cumulative Year 2042 Without Project
- Cumulative Year 2042 Plus Project

The TIS concluded that the impact on traffic would be less than significant.

5. That the planned unit development's population density, site area and dimensions, site coverage, yard spaces, height of structures, distances between structures, off-street parking and off-street loading facilities, landscaped areas and street design will produce an environment of stable and desired character consistent with the purpose of this title.

**Analysis:** That the project has been evaluated for consistency with the requirements of Section 17.14 High-Density Residential zone district and 17.20 C-S Service Commercial zone district. All requirements for density, site area, dimensions, site coverage, open space, height of structures, distance between structures, off-street parking and loading facilities, and landscaped areas have been satisfied, except where expressly modified by the Hanford Place Master Plan (PUD 2022-01). The modifications proposed through the Hanford Place Master Plan will produce a cohesive design and an environment of stable and desired character consistent with the purpose of this title. The implementation of medical and mixed-use developments achieves several goals and policies of the General Plan, specifically Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80.

6. That the combination of different dwelling types, architectural appearance, and/or varieties of land uses in the development will complement each other and harmonize with the existing and proposed land uses in the vicinity.

**Analysis:** The Hanford Place Master Plan proposes a medical and mixed-use development on an underutilized, infill parcel, proposed to be designated as C-S Service Commercial and R-H High-Density Residential. Through cohesive design, comprehensive design criteria, and medical-focused uses, with supportive residential, educational, and commercial uses, the Planned Unit Development proposes a design and combination of uses that will complement and harmonize across the zone districts proposed and achieve a goal of the General Plan to promote horizontal mixed-use development. The implementation of medical and mixed-use developments achieves several goals and policies of the General Plan, specifically Goals E1, L2, and L3, and Policies L38-41, L51-55, L11, L107, L135, L137 and P80.

**THEREFORE, BE IT RESOLVED** that Planned Unit Development No. 2022-01 be approved subject to Hanford Place Master Plan, and the conditions of approval, attached as **Exhibit C.**

## **EXPIRATION**

This Planned Unit Development permit shall become null and void two (2) years after the effective date of approval, unless, prior to the expiration, either a building permit is issued by the building official, and construction is commenced and diligently pursued toward completion on the property that was the subject of the approved permit or the use for which the permit was approved has commenced. When any planned unit development permit that is approved in conjunction with a tentative subdivision map or parcel map pursuant to Title 16, the planned unit development shall not expire unless the tentative subdivision map or parcel map also expires, and an extension of the tentative subdivision map or parcel shall be deemed to be an extension of the planned unit development permit. Prior to expiration of a permit, a person having authority to file an application may file a written request with the Community Development Director for extension of a permit that may otherwise expire. The request for extension will be taken to the Planning Commission, who may extend the expiration of the permit by one year.

**PASSED AND ADOPTED** at a regular meeting of the Planning Commission of the City of Hanford by the following vote:

AYES: Commissioners  
NOES: Commissioners  
ABSTAIN: Commissioners  
ABSENT: Commissioners

STATE OF CALIFORNIA)  
COUNTY OF KINGS )ss  
CITY OF HANFORD )

I, **Jason Waters**, Secretary of the City of Hanford Planning Commission, do hereby certify the foregoing Resolution was duly passed and adopted by the Planning Commission of the City of Hanford at a regular meeting thereof held on the 8<sup>th</sup> day of August, 2023.

Jason Waters, Secretary



**Exhibit A**  
Planned Unit Development No. 2022-01  
Hanford Place Master Plan



OWNER:  
**THE HANFORD GROUP**

# HANFORD PLACE

MEDICAL AND MIXED-USE PROPERTY



LANGDON WILSON  
INTERNATIONAL



## PROJECT INTRODUCTION

The Hanford Group property is formed by three parcels:

|                  |             |
|------------------|-------------|
| Garavello Parcel | 23.35 Acres |
| Liebert Parcel   | 8.79 Acres  |
| Robinson Parcel  | 7.02 Acres  |

The proposed program is for structures that will cover Medical outpatient clinic services, Hospitality, Specialized Education, Retail, Medical Office, Skilled Nursing and Assisted Living, and Multi-family.



## SITE CONTEXT

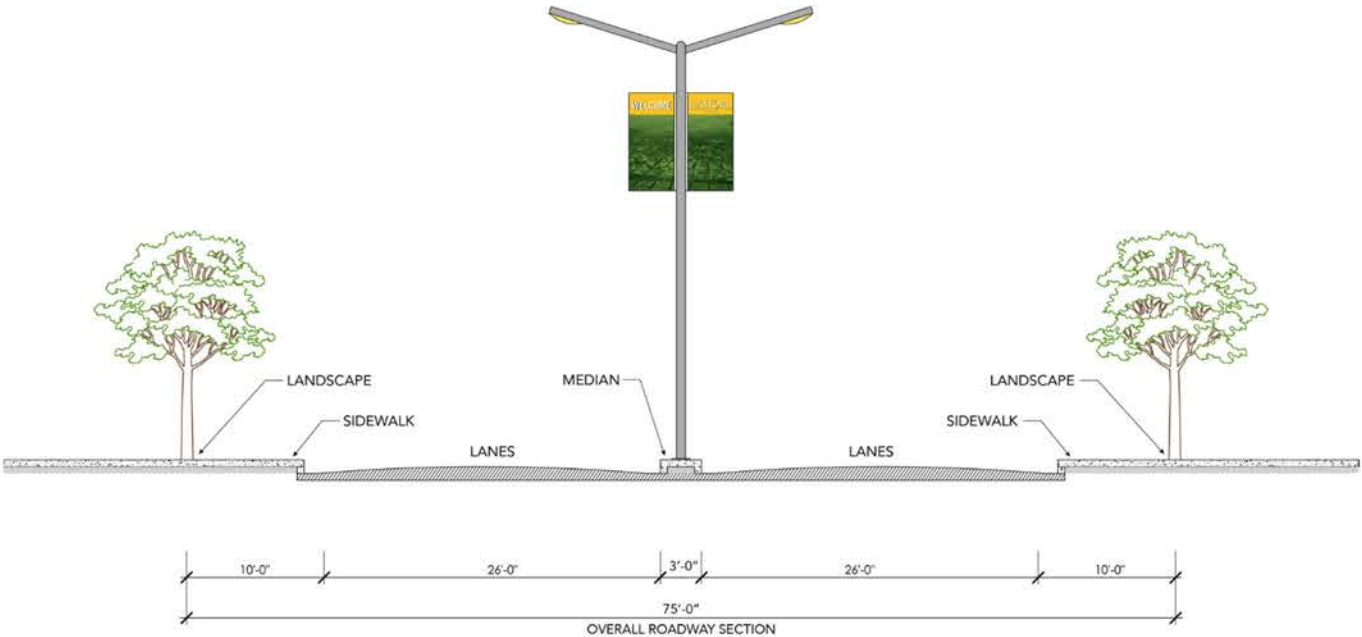
The site is bound by highway 198 and the SJV railroad. There is a 50 foot setback from the centerline of the railroad to the proposed buildings. 5th Street cuts across the property in an East West direction. Campus Drive creates an entry directly into the site. Adventist Health is to the northwest of the site. The People Ditch runs through this property and must maintain required setbacks and Hwy 198 makes up the southern boundary of the project.





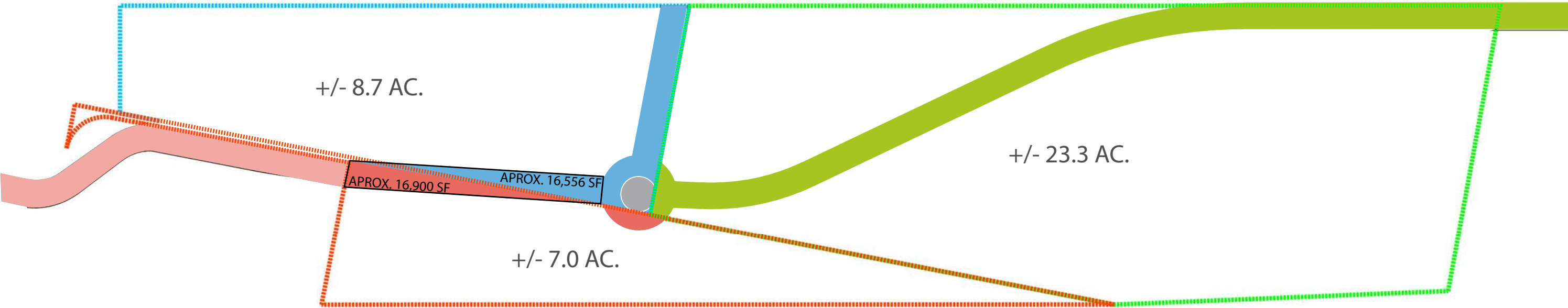
ROADWAY NETWORK

The proposed extension of Glendale Ave, 5th St. and Campus Dr. will be constructed to City standards and will be dedicated as public right of way. The proposed round a bout will also be public right of way and will be designed per Caltrans, or similar City approved, design standards. Typical City utilities (water, sewer and storm drain) will be constructed within the proposed right of way. As part of this proposal, Glendale Ave will be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle will be removed and Glendale will be realigned using speed specific design curves. Any new portion of Glendale Ave will be dedicated as public right of way and any portion of existing right of way not used will be abandoned. 5th St. will be extended starting on the existing alignment before realigning to the round a bout.



- BG ROAD
- SL RAOD
- ROB ROAD
- OFFSITE BG ROAD
- OFFSITE ROB ROAD

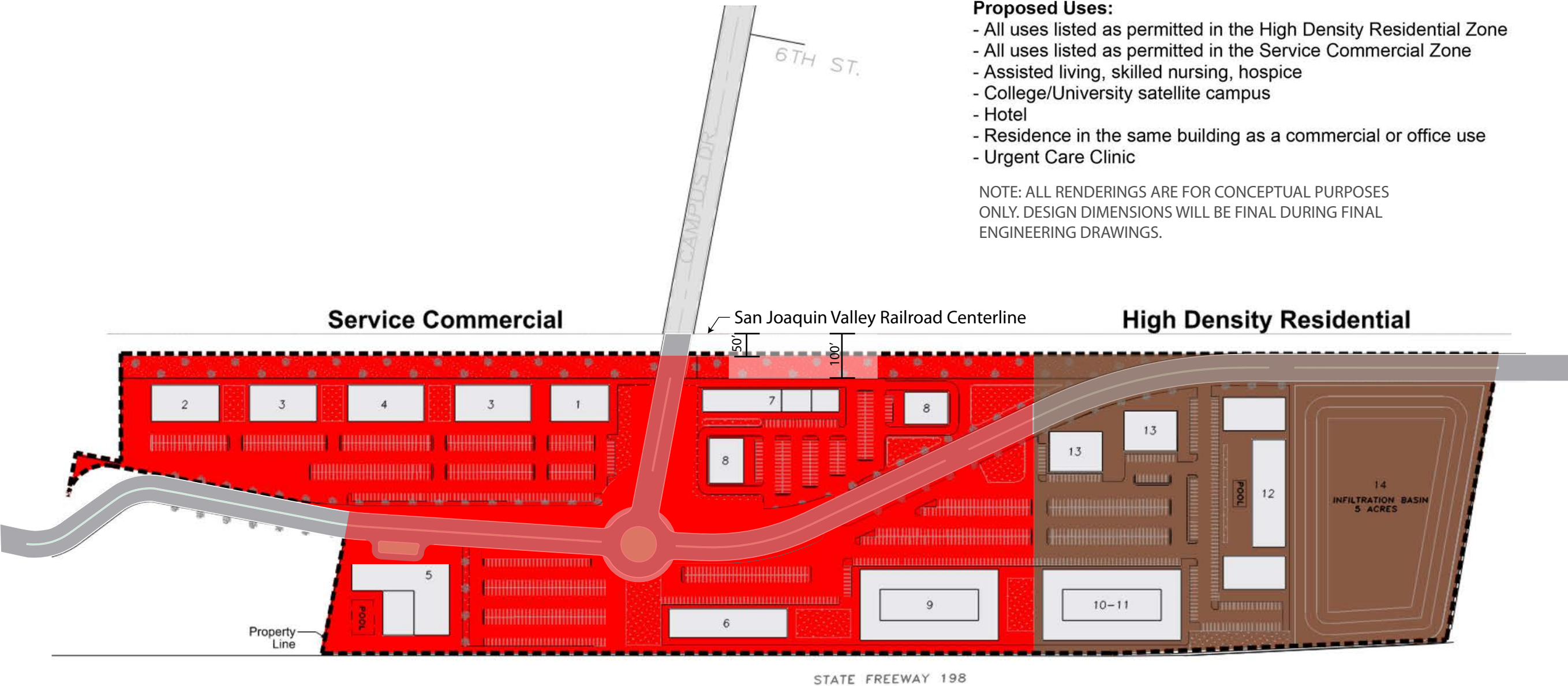
NOTE: ALL RENDERINGS ARE FOR CONCEPTUAL PURPOSES ONLY. DESIGN DIMENSIONS WILL BE FINAL DURING FINAL ENGINEERING DRAWINGS.



VISUALS - SITE PLAN







- Proposed Uses:**
- All uses listed as permitted in the High Density Residential Zone
  - All uses listed as permitted in the Service Commercial Zone
  - Assisted living, skilled nursing, hospice
  - College/University satellite campus
  - Hotel
  - Residence in the same building as a commercial or office use
  - Urgent Care Clinic

NOTE: ALL RENDERINGS ARE FOR CONCEPTUAL PURPOSES ONLY. DESIGN DIMENSIONS WILL BE FINAL DURING FINAL ENGINEERING DRAWINGS.

**LEGEND**

|                                                                         |                                                                                                     |                                                                               |                                                                       |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1. AMBULATORY SURGERY CENTER<br>2 LEVELS - 22,525 SF 4:1000             | 5. HOTEL & CONFERENCE CENTER<br>4 LEVELS - 100,000 SF -105 KEYS,<br>PARKING 1:ROOM + 1 PER EMPLOYEE | 7. STRIP RETAIL<br>1 LEVEL-4 UNITS - 15,500 SF 1:300                          | 11. ALF - ASSISTED LIVING FACILITY<br>1 LEVEL-34,380 SF 1:UNIT        |
| 2. SPECIALTY CLINIC<br>1 LEVEL - 12,445 SF 4:1000                       | 6. NURSING COLLEGE<br>2 LEVELS - 35,000 SF<br>PARKING 1 PER EMPLOYEE+ 10 PER                        | 8. RETAIL/DRIVE THRU/MEDICAL COMMERCIAL<br>1 LEVEL- 2UNITS - 15,000 SF 1:300  | 12. MULTIFAMILY APARTMENT<br>3 LEVELS - 1 BLOCKS - 90 TOTAL UNITS     |
| 3. MOB - MEDICAL OFFICE BUILDING<br>1 LEVEL - 12,445 SF/BLDG (2) 4:1000 | CLASSROOM(8-10 CLASSROOMS)                                                                          | 9. SNF - SKILLED NURSING FACILITY<br>2 LEVELS - 54,611 SF - 59 UNITS 1:4 BEDS | 13. MEDICAL/COMMERCIAL<br>1 LEVEL-2 BLDGS - 11,000 SF 4:1000 PER BLDG |
| 4. PHF - PSYCHIATRIC HEALTH FACILITY<br>1 LEVEL - 12,445 SF 1:4000      |                                                                                                     | 10. MEMORY CARE<br>1 LEVEL - 34,380 SF - 40 UNITS 1:4 BED                     | 14. BIO INFILTRATION BASIN<br>5.0 ACRES                               |



## ZONING AND ALLOWED USES

- The Zoning would change from existing Highway Commercial (C-H) to High Density Residential (R-H) and Service Commercial (C-S). (See map on previous page.)
- Through the Planned Unit Development (PUD), the following uses shall be allowed by right. This would apply to all locations on the site and would not be limited by the conceptual site plan.
  - All uses listed as permitted or conditionally permitted in the High Density Residential Zone R-H).
  - All uses listed as permitted or conditionally permitted in the Service Commercial Zone (C-S).
  - Assisted living, skilled nursing, hospice.
  - College/University satellite campus.
  - Hotel.
  - Residence in the same building as a commercial or office use.
  - Urgent Care Clinic.
- The overall intensity of the total site would be limited by the intensity analyzed in the CEQA document. A higher intensity than that would require an amendment to the PUD. Land use locations are flexible and may change from the conceptual plan. The roadway alignments and ponding basin location would not change.
- The included conceptual layout for the site has been prepared by Langdon Wilson Intl. Architecture. Individual sites may be developed independently of the Master Plan, allowing for building size, placement, and use to vary from the character in the illustrations.
- Revised layout plans would be followed up with specific site plans and parcel maps that would create the public ROW.

## DESIGN CONDITIONS

In order for Hanford Place to have a consistent theme and to operate as a cohesive group of uses, the following design conditions are incorporated into the PUD:

1. Establish that cross access and shared parking agreements are required for adjacent parcels as they are created prior to, or in conjunction with, parcel map or lot line adjustment approval.
2. Landscaping and lighting design shall be consistent between the sites in the PUD plan area.
3. Uses are not required to obey the zone boundary in the PUD plan area. Uses within the PUD plan area can be from either of the zones within the PUD plan area.
4. A block wall is not required within the PUD plan area between the zones.
5. Additional building setbacks are not required between the two zones within the PUD plan area. The C-S zone required setbacks shall apply to the entire PUD plan area.
6. The maximum building height for the PUD area shall be per the C-S zone, which is 50 feet.
7. Buildings within the PUD plan area shall have a uniform/cohesive design type, with the exception of standalone residential or hotel buildings, which are not required to have similar design but shall have compatible colors and design elements. Elevation plans shall be submitted with site plans to confirm compliance. Standards shall be set by the first development in the PUD plan area for succeeding developments.
8. The number of on-site parking spaces shall be as follows:
  - a. motel or hotel - 1 space per guest room plus 1 space per employee
  - b. assisted living, skilled nursing facility, or hospice - 1 space for every 4 beds
  - c. multifamily dwellings - at least 50% of spaces shall be covered
    - i. one-bedroom - 1.5 spaces per dwelling unit
    - ii. two-bedroom - 1.75 spaces per dwelling unit
    - iii. three or more bedrooms - 2 spaces per dwelling unit
  - d. all other allowed uses - 1 space per 350 square feet of building space
9. A sign program shall be established prior to building permit approval for the first office or commercial use. The sign program would not apply to residential and hotel/motel uses, which would follow sign standards in the Zoning Ordinance.



## VISUALS KEY PLAN

The following visuals are an example of the architecture and a conceptual artist's take on the look and feel of the development. They are not intended to be final Design and are merely to represent scale of the development.





CAMPUS ENTRY – VIEW 07





3 WAY ROUNDABOUT INTERSECTION AT CAMPUS AND 5TH



VIEW 08

VIEW 14





BIRDSEYE VEIW 10 LOOKING EAST FROM MEDICAL OFFICE AND CLINIC PARCELS





VEIW 11 LOOKING EAST FROM MEDICAL OFFICE AND CLINIC PARCELS





VEIW 11 LOOKING WEST TO MEDICAL OFFICE AND CLINIC PARCELS





EYE LEVEL VEIW 23 LOOKING WEST TO PHF BUILDING





EYE LEVEL VIEW 17 LOOKING WEST TO AMBULATORY SURGERY CENTER BUILDING





VEIW 21 LOOKING EAST FROM HOTEL PARKING





BIRDSEYE VIEW 09 LOOKING EAST TO ROUNDABOUT FROM HOTEL





EYE LEVEL VIEW 20 OF HOTEL





BIRDSEYE VIEW 01 LOOKING NORTH OVER ALF TO MEDICAL COMMERCIAL





BIRDSEYEE VIEW 02 LOOKING WEST TO SNF AND MEDICAL COMMERCIAL





EYE LEVEL VIEW 08 LOOKING WEST FROM ALF TO HOTEL





EYE LEVEL VIEW 25 MEDICAL COMMERCIAL





EYE LEVEL VIEW 22 LOOKING SOUTHWEST TO MULTIFAMILY





BIRDSEYE VIEW 04 LOOKING WEST TO RETAIL





BIRDSEYE VIEW 04 LOOKING WEST TO RETAIL





EYE LEVEL VIEW 13 OF RETAIL





EYE LEVEL VIEWS 16 AND 03 LOOKING WEST TO RETAIL



**Exhibit B**  
Mitigation Monitoring and Reporting Program



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Biological Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Mitigation Measure BIO-1</b> Conduct Preconstruction Clearance Surveys for San Joaquin Kit Fox and Burrowing Owl. A preconstruction clearance survey is required for San Joaquin kit fox and burrowing owl no more than 30 calendar days prior to initiation of project activities. All survey results must be delivered to the United States Fish and Wildlife Service's (USFWS), the California Department of Fish and Wildlife (CDFW), and the City. If the survey results find an active burrow of one or both of these species on the project site, the applicant must coordinate with the applicable resource agencies (CDFW for burrowing owl, CDFW and USFWS for kit fox) to obtain applicable agency approval(s)/permit(s) prior to any ground disturbance activities on the site.</p> <p>Specific avoidance, den excavation, passive relocation, and compensatory mitigation activities shall be performed as required by the applicable agency. Appropriate provisions of the CDFW Staff Report on Burrowing Owl Mitigation and USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox shall be adhered to.</p> |
| <p><b>Mitigation Measure BIO-2</b> Worker Environmental Awareness Training. Prior to initial groundbreaking, Worker Environmental Awareness Training shall be conducted by a qualified biologist to educate all construction personnel on the relevant federal, state, and local laws related to potentially occurring special-status species at the site. The tailgate session shall include training on identification of species that may be found on the project site, the status of those species, and any legal protection afforded to those species. Personnel will be advised to report any special-status species encountered promptly. A fact sheet conveying this information will be prepared for display or for distribution to anyone who may enter the project site.</p>                                                                                                                                                                                                                                                                                                                                                                           |
| <p><b>Mitigation Measure BIO-3</b> Construction Site Housekeeping and Operational Requirements. Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities shall be minimized by adhering to the following USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox:</p> <p>a) To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas shall also be included in preconstruction surveys and, to the extent possible, shall be established in locations disturbed by previous activities to prevent further impacts.</p>                                                                                                                                                                                                                                                                                                                                                                                                         |

b) Project-related vehicles shall observe a daytime speed limit of 20-mph throughout the site in all project sites, except on county roads and state and federal highways; this is particularly important at night when kit foxes are most active. Night-time construction shall be minimized to the extent possible. However, if it does occur, then the speed limit shall be reduced to 10-mph. Off-road traffic outside of designated project sites shall be prohibited.

c) To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steepwalled holes or trenches more than 2-feet deep shall be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the USFWS and the CDFW shall be contacted.

d) Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW have been consulted. If necessary, and under the direct supervision of a qualified biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped. In the case of trapped animals, escape ramps or structures shall be installed immediately to allow the animal(s) to escape, or the USFWS and CDFW should be contacted for further guidance.

e) All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from a construction or project site.

f) Pets, such as dogs or cats, shall not be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.

g) Use of rodenticides and herbicides in project sites shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

**Mitigation Measure BIO-4** Nesting Bird Surveys and Avoidance. If vegetation removal, construction, or grading activities are planned to occur within the active nesting bird season (February 15 through September 15), a qualified biologist shall conduct a preconstruction nesting bird survey no more than 5 days prior to the start of such activities. The nesting bird survey shall include the project site and areas immediately adjacent to the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust, etc. For any active nest(s) identified, the qualified biologist shall establish an appropriate buffer zone around the active nest(s). The appropriate buffer shall be determined by the qualified biologist based on species, location, and the nature of the proposed activities. Project activities shall be avoided within the buffer zone until the nest is deemed no longer active by the qualified biologist.

**Mitigation Measure BIO-5** Agency Coordination for Peoples Ditch. Prior to any modifications to Peoples Ditch, it is recommended to consult with the United States Army Corps of Engineers (USACE), CDFW, and Regional Water Quality Control Board (RWQCB) to verify the feature's jurisdictional status and obtain applicable permit(s) and/or authorization(s). A notification of streambed alteration should be submitted to the CDFW in accordance with Section 1602 of the California Fish and Game Code. Unless categorically excluded under effective definitions or existing documentation confirms that no permit is needed, the Central Valley RWQCB and Sacramento District of the USACE should be consulted regarding potential permitting needs under the California Water Code and federal Clean Water Act, respectively, associated with the proposed Peoples Ditch modifications.

### **Cultural Resources**

#### *Will the project:*

Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Disturb any human remains, including those interred outside of formal cemeteries?

### **Mitigation Measures**

**Mitigation Measure CULT-1** Because of the very high sensitivity of the soil type in the project area, the possibility exists that buried archaeological deposits within the project site. Therefore, archaeological monitoring must be conducted during ground-disturbing construction activities in native soil, including clearing and grubbing. Monitoring should occur on a full-time basis during all excavation activities until the Project Archaeologist, based on the archaeological monitor's observations, is satisfied that there is little likelihood of encountering intact archaeological deposits. The Project Archaeologist may also determine it is appropriate to reduce monitoring to spot-checking or on a part-time basis. Upon completion of the monitoring and, if necessary, mitigation, the archaeologist should prepare a report to document the methods and results of the monitoring. The final report should be submitted to the SSJVIC.

**Mitigation Measure CULT-2** Additional mapping and subsurface testing of AE-4167-01 shall be conducted to evaluate its eligibility for inclusion in the California Register of Historical Resources, pursuant to California Public Resources Code (PRC) 5024.1. Additional focused subsurface testing in areas not previously disturbed by historic-era activities must be conducted to confirm presence/absence of high-sensitivity paleosols that may include intact prehistoric cultural deposits. If intact prehistoric cultural deposits are encountered during subsurface presence/absence testing, further investigation must be conducted to determine if the deposit retains integrity and is eligible for inclusion in the California Register of Historical Resources. The methods and findings of the additional studies would be presented as an addendum to the Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project and would include cultural resource management recommendations to guide mitigation of potential adverse effects to any identified historical resources within the project area.

**Mitigation Measure CULT-3** Any human remains encountered during project-related ground disturbing activities shall be treated in accordance with California Health and Safety Code Section 7050.5. The project sponsor shall inform all contractor(s) performing excavation of the sensitivity of the project site for human remains and include the following directive in the appropriate contract documents: If human remains are uncovered, all work within 50 feet of the discovery shall be halted and the Kings County Coroner notified immediately. At the same time, the on-site monitoring archaeologist shall assess the situation and consult with agencies as appropriate.



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project personnel shall not collect or move any human remains or associated materials. If the human remains are of Native American origin, the Coroner must notify the California State Native American Heritage Commission (NAHC) within 24 hours of this identification. The NAHC will formally identify a Native American Most Likely Descendant (MLD)—if one is not already on-site—to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods. Such recommendations shall be carried out to the satisfaction of the NAHC prior to work resuming within 50 feet of the discovered remains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Mitigation Measure CULT-4</b> A Burial Treatment Plan shall be entered into by the project applicant/property owner prior to any ground disturbing activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Geology and Soils</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| b. Result in substantial soil erosion or the loss of topsoil?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| f. Directly or indirectly destroy a unique paleontological                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GEO-1</b> To reduce the potential for soil erosion during construction of the proposed project, an Erosion Control Plan shall be prepared for the project in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity, prior to the start of grading.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GEO-2</b> The project applicant shall inform its contractor(s) of the sensitivity of the project area for paleontological resources. Should paleontological resources be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. If found to be significant, and project activities cannot avoid the paleontological resources, adverse effects to paleontological resources shall be mitigated. Mitigation may include monitoring, recording the fossil locality, data recovery and analysis, a final report, and accessioning the fossil material and technical report to a paleontological repository. Public educational outreach may also be appropriate. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared and submitted to the City for review, and (if paleontological materials are recovered) a paleontological repository, such as the University of California Museum of Paleontology (UCMP). The City shall verify that the above directive has been included in the appropriate contract documents. |
| <b>Greenhouse Gas Emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Mitigation Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Mitigation Measure GHG-1</b> In order to meet the 2022 Scoping Plan greenhouse gas (GHG) requirements, consistent with State GHG reduction and equity prioritization goals, the proposed project shall provide electric vehicle charging capabilities that meet the most ambitious voluntary standard in the California Green Building Standards Code at the time of project approval as part of the final project design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hydrology and Water Quality</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Will the project:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:</p> <ul style="list-style-type: none"> <li>i. Result in substantial erosion or siltation on- or off-site;</li> <li>ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite</li> <li>iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or</li> <li>iv. Impede or redirect flood flows?</li> </ul>           |
| <p>e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Mitigation Measures</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>Mitigation Measure HYDRO-1</b> To minimize any potential short-term water quality effects from project-related construction activities, the project contractor shall implement Best Management Practices (BMPs) in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity. In addition, the proposed project shall be in compliance with existing regulatory requirements, including the Water Pollution Control Preparation (WPCP) Manual. In addition, implementation of a Storm Water Pollution Prevention Plan (SWPPP) would be required under the National Pollutant Discharge Elimination System (NPDES) to regulate water quality associated with construction activities.</p> |
| <p><b>Mitigation Measure HYDRO-2</b> To reduce the potential for degradation of surface water quality during project operation, a Storm Water Management Plan (SWMP) shall be prepared for the proposed project. The SWMP shall describe specific programs to minimize storm water pollution resulting from the proposed project. Specifically, the SWMP shall identify and describe source control measures, treatment controls, and BMP maintenance requirements to ensure that the project complies with post-construction storm water management requirements of the Regional Water Quality Control Board (RWQCB).</p>                                                                                                                   |
| <p><b>Noise</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><i>Will the Project?</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>a. Cause generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Mitigation Measure</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Mitigation Measure NOI-1 Truck Movements.</b> All truck movements occurring during nighttime hours of 10:00 p.m. to 7:00 a.m. shall be required to use the Glendale Avenue access point only.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Mitigation Measure NOI-2** The project contractor shall implement the following measures during construction of the project:

- Per the City of Hanford Municipal Code, construction activities should not occur outside the hours of 7:00 a.m. to 8:00 p.m.
- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.
- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.
- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing the contact phone number of a designated noise disturbance coordinator.

**Mitigation Measure NOI-3 Exterior Noise Levels.** The final design shall include a minimum 6.5- foot above-ground level sound wall around outdoor activity areas associated with the proposed hotel and apartment land uses to mitigate exterior noise levels to below 65 dB Ldn within these outdoor activity areas.

**Mitigation Measure NOI-4 Interior Noise Levels.** Once building-specific construction plans become available, interior noise levels should be reviewed and calculated by a qualified acoustical consultant to determine if additional noise attenuation mitigation measures are required to comply with interior noise level standards.

#### **Tribal Cultural Resources**

*Will the project:*

a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

- i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?  
Or
- ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

#### **Mitigation Measures**

See Mitigation Measures CULT-1 through CULT-4,

#### **Utilities and Service System**

*Will the project:*

Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

| Mitigation Measures            |
|--------------------------------|
| See Mitigation Measure HYDRO-1 |



**Exhibit C**  
Conditions of Approval

**PLANNING DIVISION**

**SITE PLAN NUMBER:** PUD 2022-01; CUP0019-23

**CONTACT:** Gabrielle Myers, Senior Planner (559) 585-2578

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**General Plan Designation:** Highway Commercial; Service Commercial and High-Density Residential proposed

**Zoning:** C-H Highway Commercial; C-S Service Commercial and R-H High-Density Residential proposed

**Other Special Districts:** Hanford Place Master Plan

**Required Entitlements:**

1. General Plan Amendment
2. Rezone
3. Planned Unit Development (Master Plan)
4. Tentative Parcel Map (future) – Any future land divisions will require a Tentative Parcel Map application
5. Site Plan Review (future) – future development proposals will be evaluated through site plan review. Each site plan will be evaluated for consistency with the Hanford Place Master Plan and C-S or R-H standards where the plan is silent.

**General Requirements:**

1. That approval of this project does not exempt compliance with all applicable sections of the Zoning Ordinance, Public Works Improvement Standards, fees, or other City Ordinances.
2. That all approved proposals of the applicant be conditions of development, if not mentioned herein.
3. That no expansion of the use which would tend to increase the projected scale of operations beyond the scope and nature described in this tentative tract shall be permitted except upon application for, and approval of, modification of this application according to all procedures and requirements thereof.
4. That if cultural resources are discovered during construction or related activities, all work shall be halted and a qualified archeologist and the City of Hanford shall be notified. The find shall be properly investigated and appropriate measures are to be taken before construction may continue.

**General:**

- ☒ That uses shall be permitted or not permitted, conditionally permitted, administratively permitted, or temporarily permitted as described on page 5 of the Hanford Place Master Plan and the land use tables in Sections [17.08.020](#) and [17.08.030](#) based on the base zone district, in which the use is located.
- ☒ That development conform to Hanford Place Master Plan and all applicable regulations of:

- Section 17.14 for the High-Density Residential zone district; and
- Section 17.18 for the Service Commercial zone district;

**R-H High-Density Residential Zone Requirements (all checked shall apply)**

**Dwelling Units per Lot** (Section 17.14.050)

- ☒ That the minimum site area per dwelling unit shall be 1,500 square feet.

**Coverage** (Section 17.14.060)

- ☒ That the maximum coverage of a lot shall be determined by the combined building setback area requirements, accessory structure limitations, open space requirements, and off-street parking.

**Building Setback Area** (Section 17.14.070) **modified by Master Plan, follow Master Plan Design Regulations**

- ☒ That no structure shall be placed within a building setback area.
- ☒ The front building setback area shall be 15 feet from the front lot line for livable space and 20 feet for garages, carports, and other non-livable building space.
- ☒ That the rear building setback shall be 15 feet from the rear lot line, except where there is a landscape easement with a wall or fence on the rear of the lot, then the rear building setback shall be 20 feet.
  - ☒ The rear building setback area shall be increased by 10 feet for buildings over one-story high.
- ☒ That where there is a landscape easement with a wall or fence on the street side of the lot the side yard setback area shall be measured from the easement area instead of the side lot line.

**Distances between Structures:** (Section 17.14.080)

- ☒ That the minimum distance between structures shall be 10 feet, except as provided by the building code.

**Height of Structures** (Section 17.14.090) **modified by Master Plan, follow Master Plan Design Regulations**

- ☒ That the maximum structure height shall be 35 feet.
- ☒ Exceptions to height limitations: penthouses or roof structures for the housing of elevators, stairways, tanks, ventilating fans, air-conditioning equipment, or similar equipment required to operate and maintain buildings, and fire and parapet walls, skylights, towers, spires, cupolas, road signs (where permitted), flagpoles, chimneys, smokestacks, televising and radio masts,

or similar structures may be erected above the height limit, but shall not be allowed for the purpose of providing additional floor space.

**Usable Open Space** (Section 17.14.150)

- ☒ That lots with four or less dwelling units shall provide for a usable open space area of a minimum 300 square feet per dwelling unit. The open space shall be a minimum of 15 feet side.
- ☒ That lots with five or more dwelling units shall provide for a usable open space area equal to five percent of the lot area. Where multiple lots that together make up a single development site, the required open space may be combined into common open space areas that are accessible to all residents of the site.

**Off Street Parking:** (Section 17.54). **modified by Master Plan, follow Master Plan Design Regulations**

That the applicant shall provide **x (undetermined)** parking stalls on site (minimum), as shown on the approved site plan. Per the Hanford Municipal Code Section 17.54.040, parking shall be provided, as follows:

| Unit Type       | Parking Space Requirement | Measuring unit | # of Stalls Required | Total Covered |
|-----------------|---------------------------|----------------|----------------------|---------------|
| Studio          | 1 space                   |                |                      |               |
| 1-bedroom unit  | 1.5 spaces; 50% covered   |                |                      |               |
| 2-bedroom unit  | 1.75 spaces; 50% covered  |                |                      |               |
| 3-bedroom unit  | 2 spaces; 50% covered     |                |                      |               |
| Community Space | 1 space per 300 sq. ft.   |                |                      |               |
| Total           |                           |                |                      |               |

- ☒ That a minimum of **x (undetermined)** stalls shall be covered parking stalls.
- ☒ That the standard parking space shall not be less than 18.5 feet in length and nine feet in width, exclusive of aisles and access drives (Section 17.54.110 A).
- ☒ That the maximum number of compact-car parking spaces is limited to 30 percent of the total parking spaces required. A compact parking space shall not be less than 16 feet in length and 8 feet in width, and **marked for compact cars** (Section 17.54.110 B. and C).
- ☒ That there shall be no more than four compact spaces adjacent to each other.
- ☒ That parking for bicycles and low-emission vehicles shall be provided in accordance with the latest adopted version of the California Building Code (Section 17.54.190).



- ☒ That the required parking spaces may not be provided within any front, side, or rear building setback area.

**Signage:** (Section 17.56).

- ☒ That any/all signs proposed for this development shall be subject to the requirements and standards prescribed in Chapter 17.56 of the Hanford Municipal Code. **A separate application is required.**

**Fencing and Walls:** (Section 17.50.110 and 17.50.120). **modified by Master Plan, follow Master Plan Design Regulations**

- ☒ That fences and walls in the R-H zone district shall be constructed or installed in accordance with the following:
  - ☒ Along a rear lot line not exceeding seven feet in height
  - ☒ Along an interior side lot line not exceeding seven feet in height beginning at 10 feet from the front lot line.
- ☒ That any proposed fencing on the site be maintained in good repair.
- ☒ That no fence or wall shall be placed within the public right-of-way.
- ☒ That a masonry fence exceeding three (3) feet in height shall require engineered footings and a building permit. All other fencing exceeding seven (7) feet in height shall require engineered post footings and a building permit.
- ☒ That no hedge, shrub, fence, or wall exceeding the three (3) feet in height, or four (4) feet in height if the upper one (1) foot is fifty (50) percent or more open shall be planted, placed, or maintained within the twenty-five (25) feet corner sight triangle of a corner lot, or along a front or street side property line where the hedge, shrub, fence, or wall creates a traffic or pedestrian hazard as determined by the Community Development Director.

**Landscaping:** (Section 17.52.060).

- ☒ General Design Standards: the following features shall be incorporated into the design of the proposed landscape and shown on the required landscape plans:
  - ☒ Publicly maintained landscape areas shall be separated from privately maintained landscape areas with, at a minimum, a four (4) inch wide concrete mow strip.
  - ☒ Pedestrian access to sidewalks and structures shall be integrated with the design of landscaped areas.
  - ☒ Landscape adjacent to driveways and parking areas shall be protected from vehicle damage through the provision of a minimum six (6) inch high and six (6) inch wide concrete curb.
  - ☒ Concrete mow strips, when used, shall be a minimum of four (4) inches in width.

- ☒ Trees and shrubs shall be planted so that at maturity they do not interfere with utility lines and traffic safety sight areas.
- ☒ Trees and shrubs shall be planted and maintained in a manner that protects the basic rights of adjacent property owners, particularly the right to solar access.
- ☒ Trees planted within five (5) feet of sidewalks or curbs shall have an eighteen (18) inch by ten (10) foot long linear root barrier placed at each edge of the sidewalk or face of curb, centered on the tree.
- ☒ Plant materials. Plant materials shall be selected and installed in accordance with the following requirements:
  - ☒ The size of ten (10) percent of the trees to be planted shall be twenty-four (24) inch box or larger. The remaining trees shall be sized fifteen (15) gallons or larger.
  - ☒ The size of seventy (70) percent of plants and shrubs shall be at five (5) gallon or larger. The remaining plants and shrubs shall be sized one (1) gallon or larger.
  - ☒ The size of groundcover at planting shall be one (1) gallon or larger.
  - ☒ Groundcover shall be designed to have one hundred (100) percent coverage within two (2) years.
  - ☒ Drought tolerant plant material and climate appropriate species shall be emphasized in the design.
- ☒ That the landscaped area shall be planted with live and healthy plant materials suitable for screening/or ornamenting the site. Landscaped areas shall be watered by automatic systems and designed and developed in accordance with Chapter 12.08 and the most recent State Model Water Efficient Landscaped Ordinance.
- ☒ That no fence, hedge, or shrub shall be installed, planted, or maintained along a street frontage, which creates a traffic or pedestrian hazard.
- ☒ That all building setback areas and open space areas required which are visible from the public right-of-way shall be landscaped.

**Trash Collection Areas** (Section 17.50.090).

- ☒ That a suitable area shall be provided on-site for collection of trash and recyclable materials for all multi-family residential, mixed-use, commercial, office, and industrial uses. Refuse storage areas shall be adequately screened from view. The refuse area enclosure shall be designed to meet the minimum recommended dimensional standards as determined by the City Engineer.
- ☒ That all uses shall be in compliance with the provisions of Chapter 13.12 of the Municipal Code.

- ☒ That if fireplaces are proposed in the residential units, natural gas fireplaces or EPA-certified wood-burning fireplaces/stoves are to be installed in every unit that has a fireplace. Conventional open-hearth fireplaces are not allowed.
- ☒ That natural gas lines and electrical outlets be installed in backyards or patios to encourage use of gas and/or electric barbecues.
- ☒ That electrical outlets be installed around the exterior of the residential units to encourage use of electric lawn mowers, edgers, etc.

**Noise:**

- ☒ That construction equipment is muffled and construction activities be limited to the hours between 7:00 a.m. to 10:00 p.m., Monday through Friday, unless the construction is within the enclosed structure or approved by the Community Development Department.
- ☒ That noise from fixed mechanical equipment, when measured at the property line, meets the standard of the Hanford Noise Element.

**Rooftop Equipment** (Section 17.50.100)

- ☒ That all elevator housing and mechanical equipment located on the roof of any building shall be screened from adjacent views and contained within a completely enclosed penthouse or portion of the same building having walls and roofs with construction and appearance similar to the building.

**Outdoor Lighting Standards** (Section 17.50.140)

- ☒ That all lights and light fixtures, except public street lights, shall be located, aimed or shielded so as to minimize light trespassing across property boundaries or skyward.
- ☒ That no lights or light fixtures shall flash, revolve, blink or otherwise resemble a traffic control signal or operate in such a fashion to create a hazard for passing traffic.
- ☒ That building mounted lighting fixtures shall be attached only to the walls of the building. The top of a light fixture attached to a building wall shall not be higher than the top of the building parapet or the top of the roof eave, whichever is lower.
- ☒ That canopy ceiling light fixtures shall be recessed or the sides of the lens area shall be shielded in order to eliminate emission of horizontal light.
- ☒ That mercury vapor lamps shall be a fully shielded fixture with all light directed on-site.
- ☒ That freestanding light fixtures shall not exceed eighteen (18) feet in height measured from the top of a light fixture to the adjacent grade at the base of the support for that light fixture.

**Tents, Tarps, and Other Coverings** (Section 17.50.130)

- ☒ That no front or side building setback area shall be covered by tents, tarps, cloth, fabric, or a wood or metal covering or structure except for the following:

- ☒ Standard window and door awnings
- ☒ Ornamental covers, such as a sidewalk or entry awning trellis, or other similar improvement intended as an improved passageway or for aesthetic purposes providing architectural integrity with the building to which it is attached. Supports shall be ninety (90) percent open and shall not be enclosed.

**Dust Control:**

- ☒ That the appropriate dust-control practices of the San Joaquin Valley Air Pollution Control District shall be implemented.
- ☒ That the any necessary permits be obtained through the San Joaquin Valley Air Pollution Control District.

**The below are considered draft comments until final approval of the site plan**

**C-S Service Commercial Checklist:** (all checked shall apply)

**General:**

- ☒ That approval of this project does not exempt compliance with all applicable sections of the Zoning Ordinance, Public Works Improvement Standards, fees, or other City Ordinances.
- ☒ That all approved proposals of the applicant be conditions of development, if not mentioned herein.
- ☒ That the site be developed according to the approved site plan, titled Site Plan Review No. 2018-06 with minor modifications to be approved by the Community Development Department.
- ☒ That no expansion of the use which would tend to increase the projected scale of operations beyond the scope and nature described in this Site Plan Review shall be permitted except upon application for, and approval of, modification of this application according to all procedures and requirements thereof.

**Cultural Resources:**

- ☒ That if cultural resources are discovered during construction or related activities, all work shall be halted and a qualified archeologist and the City of Hanford shall be notified. The find shall be properly investigated and appropriate measures are to be taken before construction may continue.

**Building Setback Areas (17.20.060) modified by Master Plan, follow Master Plan Design Regulations**

- ☒ That the appropriate setbacks be maintained, as follows:
  - ☒ The front building setback area shall be 15 feet, **except that in C-S zones bounded by SR 198, 10<sup>th</sup> Avenue, 11<sup>th</sup> Avenue, and Sixth Street there is no minimum front building setback requirement.**
  - ☒ The rear building setback shall be 15 feet, as the property abuts a PF zone district.



- ☒ The side building setback shall be 15 along the north interior side property line, as the property abuts a PF zone district. **Since the building is existing, no change is required.**
- ☐ The street side building setback shall be 15 feet.

**Off Street Parking:** (Section 17.54). **modified by Master Plan, follow Master Plan Design Regulations**

- ☒ That the standard parking space shall not be less than 18.5 feet in length and nine feet in width, exclusive of aisles and access drives (Section 17.54.110 A).
- ☒ That the maximum number of compact-car parking spaces is limited to 30 percent of the total parking spaces required. A compact parking space shall not be less than 16 feet in length and 8 feet in width, and marked for compact cars (Section 17.54.110 B. and C).
- ☒ There shall be no more than four compact spaces adjacent to each other.
- ☒ That parking for bicycles and low-emission vehicles shall be provided in accordance with the latest adopted version of the California Building Code (Section 17.54.190).
- ☒ In the commercial zone district, not less than five percent of the interior square footage of a parking area shall be landscaped with trees and other plant materials suitable for ornamentation. **Parking areas are to have one tree placed at every four lineal parking stalls.**

**Signage:** (Section 17.56). **modified by Master Plan, follow Master Plan Design Regulations**

- ☒ That any/all signs proposed for this development shall be subject to the requirements and prescribed in Chapter 17.56 of the Hanford Municipal Code. A separate application is required.

**Fencing and Walls:** (Section 17.20.130) **modified by Master Plan, follow Master Plan Design Regulations**

- ☒ That a block wall with a minimum height of seven feet shall be provided along any side or rear lot line that abuts an R-H, R-M, R-L, O, OR, PF zone district.
- ☒ That no fence or wall shall be placed in front of or within any landscaped area located next to a street.
- ☒ That the open storage of materials and equipment attendant to a use shall be permitted only within an area surrounded or screened by a solid wall or fence seven feet minimum in height.
- ☒ That any proposed fencing on the site be maintained in good repair.
- ☒ That no fence or wall shall be placed within the public right-of-way.

- ☒ That a masonry fence exceeding three (3) feet in height shall require engineered footings and a building permit. All other fencing exceeding seven (7) feet in height shall require engineered post footings and a building permit.
- ☒ That no hedge, shrub, fence, or wall exceeding the three (3) feet in height, or four (4) feet in height if the upper one (1) foot is fifty (50) percent or more open shall be planted, placed, or maintained within the twenty-five (25) feet corner sight triangle of a corner lot, or along a front or street side property line where the hedge, shrub, fence, or wall creates a traffic or pedestrian hazard as determined by the Community Development Director.

**Landscaping:** (Section 17.20.120 and 17.52).

- ☒ Landscaping shall be provided and permanently maintained in a setback area not less than 15 feet from a lot line adjoining a street, except where the setback area is covered by structures, parking, or driveways.
- ☒ General Design Standards: the following features shall be incorporated into the design of the proposed landscape and shown on the required landscape plans:
  - ☒ Publicly maintained landscape areas shall be separated from privately maintained landscape areas with, at a minimum, a four (4) inch wide concrete mow strip.
  - ☒ Pedestrian access to sidewalks and structures shall be integrated with the design of landscaped areas.
  - ☒ Landscape adjacent to driveways and parking areas shall be protected from vehicle damage through the provision of a minimum six (6) inch high and six (6) inch wide concrete curb.
  - ☒ Concrete mow strips, when used, shall be a minimum of four (4) inches in width.
  - ☒ Trees and shrubs shall be planted so that at maturity they do not interfere with utility lines and traffic safety sight areas.
  - ☒ Trees and shrubs shall be planted and maintained in a manner that protects the basic rights of adjacent property owners, particularly the right to solar access.
  - ☒ Trees planted within five (5) feet of sidewalks or curbs shall have an eighteen (18) inch by ten (10) foot long linear root barrier placed at each edge of the sidewalk or face of curb, centered on the tree.
- ☒ Plant materials. Plant materials shall be selected and installed in accordance with the following requirements:
  - ☒ The size of ten (10) percent of the trees to be planted shall be twenty-four (24) inch box or larger. The remaining trees shall be sized fifteen (15) gallons or larger.
  - ☒ The size of seventy (70) percent of plants and shrubs shall be at five (5) gallon or larger. The remaining plants and shrubs shall be sized one (1) gallon or larger.
  - ☒ The size of groundcover at planting shall be one (1) gallon or larger.

- ☒ Groundcover shall be designed to have one hundred (100) percent coverage within two (2) years.
- ☒ Drought tolerant plant material and climate appropriate species shall be emphasized in the design.
- ☒ That the landscaped area shall be planted with live and healthy plant materials suitable for screening/or ornamenting the site. Landscaped areas shall be watered by automatic systems and designed and developed in accordance with Chapter 12.08 and the most recent State Model Water Efficient Landscaped Ordinance.
- ☒ That no fence, hedge, or shrub shall be installed, planted, or maintained along a street frontage, which creates a traffic or pedestrian hazard.

**Outdoor Lighting Standards** (Section 17.50.140)

- ☒ That all lights and light fixtures, except public street lights, shall be located, aimed or shielded so as to minimize light trespassing across property boundaries or skyward.
- ☒ That building mounted lighting fixtures shall be attached only to the walls of the building. The top of a light fixture attached to a building wall shall not be higher than the top of the building parapet or the top of the roof eave, whichever is lower.
- ☒ That the canopy ceiling light fixtures shall be recessed or the sides of the lens area shall be shielded, in order to eliminate emission of horizontal light.
- ☒ That the height of freestanding light fixtures, including freestanding parking lot fixtures, shall be measured from the top of a light fixture to the adjacent grade at the base of the support for that light fixture and shall not exceed 50 feet.

**Dust Control:**

- ☒ That the appropriate dust-control practices of the San Joaquin Valley Air Pollution Control District shall be implemented.
- ☒ That the any necessary permits be obtained through the San Joaquin Valley Air Pollution Control District.





OWNER:  
**THE HANFORD GROUP**

# HANFORD PLACE

MEDICAL AND MIXED-USE PROPERTY



LANGDON WILSON  
INTERNATIONAL



PROJECT INTRODUCTION

The Hanford Group property is formed by three parcels:

|                  |             |
|------------------|-------------|
| Garavello Parcel | 23.35 Acres |
| Liebert Parcel   | 8.79 Acres  |
| Robinson Parcel  | 7.02 Acres  |

The proposed program is for structures that will cover Medical outpatient clinic services, Hospitality, Specialized Education, Retail, Medical Office, Skilled Nursing and Assisted Living, and Multi-family.



SITE CONTEXT

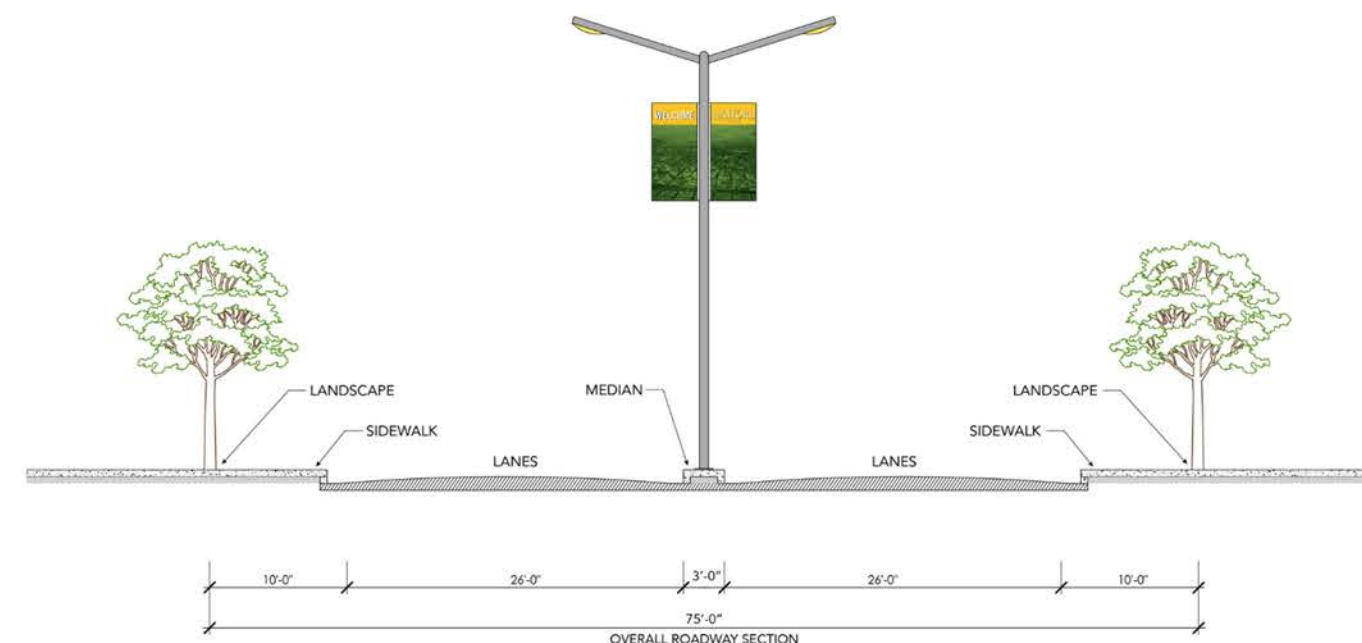
The site is bound by highway 198 and the SJV railroad. There is a 50 foot setback from the centerline of the railroad to the proposed buildings. 5th Street cuts across the property in an East West direction. Campus Drive creates an entry directly into the site. Adventist Health is to the northwest of the site. The People Ditch runs through this property and must maintain required setbacks and Hwy 198 makes up the southern boundary of the project.





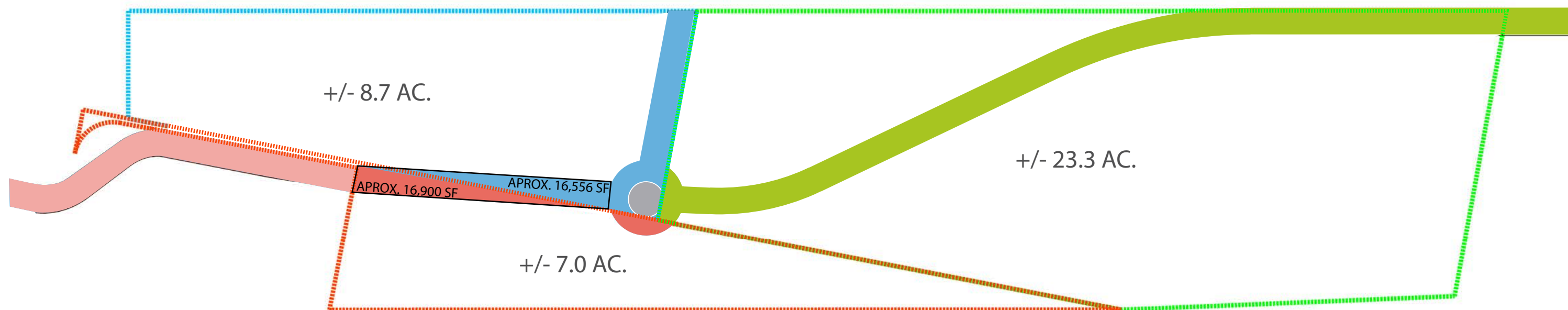
## ROADWAY NETWORK

The proposed extension of Glendale Ave, 5th St. and Campus Dr. will be constructed to City standards and will be dedicated as public right of way. The proposed round a bout will also be public right of way and will be designed per Caltrans, or similar City approved, design standards. Typical City utilities (water, sewer and storm drain) will be constructed within the proposed right of way. As part of this proposal, Glendale Ave will be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle will be removed and Glendale will be realigned using speed specific design curves. Any new portion of Glendale Ave will be dedicated as public right of way and any portion of existing right of way not used will be abandoned. 5th St. will be extended starting on the existing alignment before realigning to the round a bout.



- BG ROAD
- SL RAOD
- ROB ROAD
- OFFSITE BG ROAD
- OFFSITE ROB ROAD

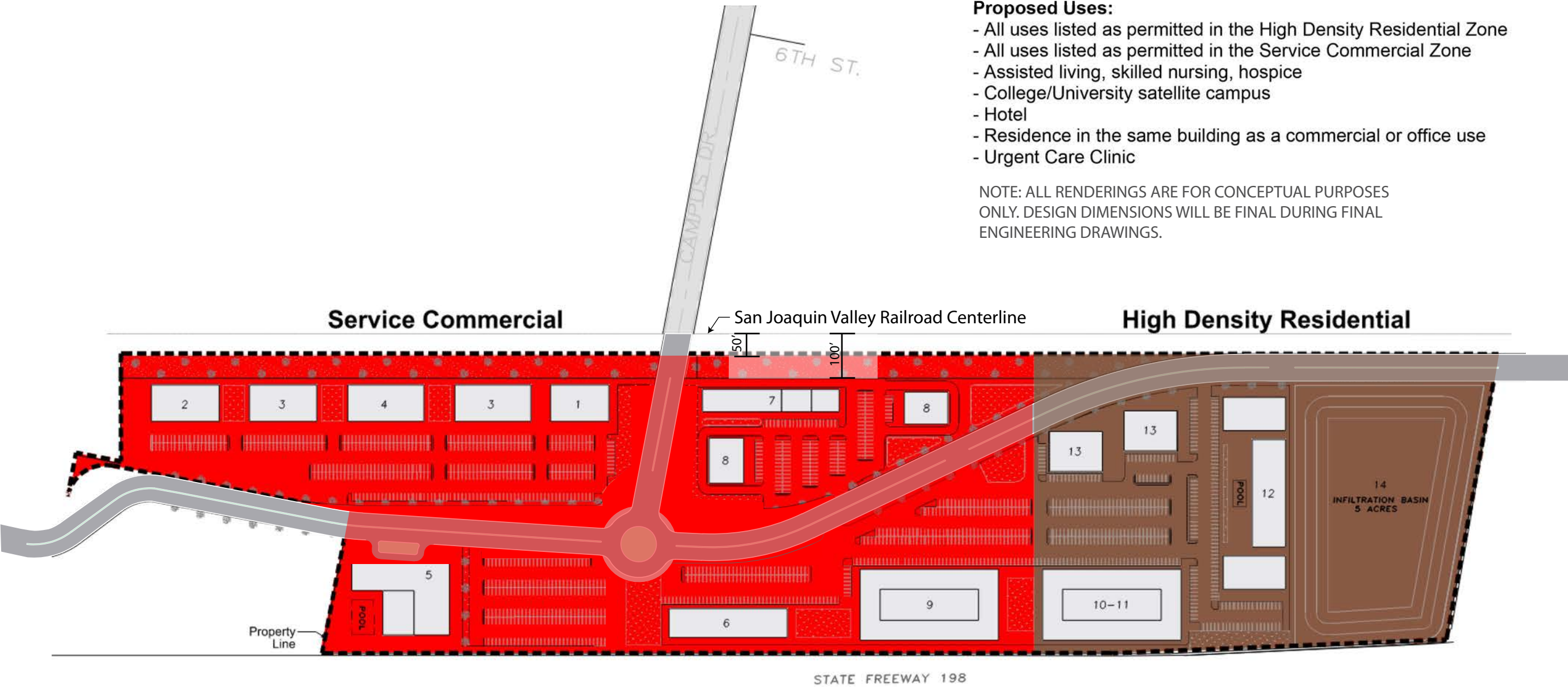
NOTE: ALL RENDERINGS ARE FOR CONCEPTUAL PURPOSES ONLY. DESIGN DIMENSIONS WILL BE FINAL DURING FINAL ENGINEERING DRAWINGS.



## VISUALS - SITE PLAN







- Proposed Uses:**
- All uses listed as permitted in the High Density Residential Zone
  - All uses listed as permitted in the Service Commercial Zone
  - Assisted living, skilled nursing, hospice
  - College/University satellite campus
  - Hotel
  - Residence in the same building as a commercial or office use
  - Urgent Care Clinic

NOTE: ALL RENDERINGS ARE FOR CONCEPTUAL PURPOSES ONLY. DESIGN DIMENSIONS WILL BE FINAL DURING FINAL ENGINEERING DRAWINGS.

**LEGEND**

|                                                                         |                                                                                                     |                                                                               |                                                                       |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1. AMBULATORY SURGERY CENTER<br>2 LEVELS - 22,525 SF 4:1000             | 5. HOTEL & CONFERENCE CENTER<br>4 LEVELS - 100,000 SF -105 KEYS,<br>PARKING 1:ROOM + 1 PER EMPLOYEE | 7. STRIP RETAIL<br>1 LEVEL-4 UNITS - 15,500 SF 1:300                          | 11. ALF - ASSISTED LIVING FACILITY<br>1 LEVEL-34,380 SF 1:UNIT        |
| 2. SPECIALTY CLINIC<br>1 LEVEL - 12,445 SF 4:1000                       | 6. NURSING COLLEGE<br>2 LEVELS - 35,000 SF<br>PARKING 1 PER EMPLOYEE+ 10 PER                        | 8. RETAIL/DRIVE THRU/MEDICAL COMMERCIAL<br>1 LEVEL- 2UNITS - 15,000 SF 1:300  | 12. MULTIFAMILY APARTMENT<br>3 LEVELS - 1 BLOCKS - 90 TOTAL UNITS     |
| 3. MOB - MEDICAL OFFICE BUILDING<br>1 LEVEL - 12,445 SF/BLDG (2) 4:1000 | CLASSROOM(8-10 CLASSROOMS)                                                                          | 9. SNF - SKILLED NURSING FACILITY<br>2 LEVELS - 54,611 SF - 59 UNITS 1:4 BEDS | 13. MEDICAL/COMMERCIAL<br>1 LEVEL-2 BLDGS - 11,000 SF 4:1000 PER BLDG |
| 4. PHF - PSYCHIATRIC HEALTH FACILITY<br>1 LEVEL - 12,445 SF 1:4000      |                                                                                                     | 10. MEMORY CARE<br>1 LEVEL - 34,380 SF - 40 UNITS 1:4 BED                     | 14. BIO INFILTRATION BASIN<br>5.0 ACRES                               |



## ZONING AND ALLOWED USES

- The Zoning would change from existing Highway Commercial (C-H) to High Density Residential (R-H) and Service Commercial (C-S). (See map on previous page.)
- Through the Planned Unit Development (PUD), the following uses shall be allowed by right. This would apply to all locations on the site and would not be limited by the conceptual site plan.
  - All uses listed as permitted or conditionally permitted in the High Density Residential Zone R-H).
  - All uses listed as permitted or conditionally permitted in the Service Commercial Zone (C-S).
  - Assisted living, skilled nursing, hospice.
  - College/University satellite campus.
  - Hotel.
  - Residence in the same building as a commercial or office use.
  - Urgent Care Clinic.
- The overall intensity of the total site would be limited by the intensity analyzed in the CEQA document. A higher intensity than that would require an amendment to the PUD. Land use locations are flexible and may change from the conceptual plan. The roadway alignments and ponding basin location would not change.
- The included conceptual layout for the site has been prepared by Langdon Wilson Intl. Architecture. Individual sites may be developed independently of the Master Plan, allowing for building size, placement, and use to vary from the character in the illustrations.
- Revised layout plans would be followed up with specific site plans and parcel maps that would create the public ROW.

## DESIGN CONDITIONS

In order for Hanford Place to have a consistent theme and to operate as a cohesive group of uses, the following design conditions are incorporated into the PUD:

1. Establish that cross access and shared parking agreements are required for adjacent parcels as they are created prior to, or in conjunction with, parcel map or lot line adjustment approval.
2. Landscaping and lighting design shall be consistent between the sites in the PUD plan area.
3. Uses are not required to obey the zone boundary in the PUD plan area. Uses within the PUD plan area can be from either of the zones within the PUD plan area.
4. A block wall is not required within the PUD plan area between the zones.
5. Additional building setbacks are not required between the two zones within the PUD plan area. The C-S zone required setbacks shall apply to the entire PUD plan area.
6. The maximum building height for the PUD area shall be per the C-S zone, which is 50 feet.
7. Buildings within the PUD plan area shall have a uniform/cohesive design type, with the exception of standalone residential or hotel buildings, which are not required to have similar design but shall have compatible colors and design elements. Elevation plans shall be submitted with site plans to confirm compliance. Standards shall be set by the first development in the PUD plan area for succeeding developments.
8. The number of on-site parking spaces shall be as follows:
  - a. motel or hotel - 1 space per guest room plus 1 space per employee
  - b. assisted living, skilled nursing facility, or hospice - 1 space for every 4 beds
  - c. multifamily dwellings - at least 50% of spaces shall be covered
    - i. one-bedroom - 1.5 spaces per dwelling unit
    - ii. two-bedroom - 1.75 spaces per dwelling unit
    - iii. three or more bedrooms - 2 spaces per dwelling unit
  - d. all other allowed uses - 1 space per 350 square feet of building space
9. A sign program shall be established prior to building permit approval for the first office or commercial use. The sign program would not apply to residential and hotel/motel uses, which would follow sign standards in the Zoning Ordinance.



## VISUALS KEY PLAN

The following visuals are an example of the architecture and a conceptual artist's take on the look and feel of the development. They are not intended to be final Design and are merely to represent scale of the development.





CAMPUS ENTRY – VIEW 07





3 WAY ROUNDABOUT INTERSECTION AT CAMPUS AND 5TH



VIEW 08

VIEW 14





BIRDSEYE VEIW 10 LOOKING EAST FROM MEDICAL OFFICE AND CLINIC PARCELS





VEIW 11 LOOKING EAST FROM MEDICAL OFFICE AND CLINIC PARCELS





VEIW 11 LOOKING WEST TO MEDICAL OFFICE AND CLINIC PARCELS





EYE LEVEL VEIW 23 LOOKING WEST TO PHF BUILDING





EYE LEVEL VIEW 17 LOOKING WEST TO AMBULATORY SURGERY CENTER BUILDING





VEIW 21 LOOKING EAST FROM HOTEL PARKING





BIRDSEYE VIEW 09 LOOKING EAST TO ROUNDABOUT FROM HOTEL





EYE LEVEL VIEW 20 OF HOTEL





BIRDSEYE VIEW 01 LOOKING NORTH OVER ALF TO MEDICAL COMMERCIAL





BIRDSEYEE VIEW 02 LOOKING WEST TO SNF AND MEDICAL COMMERCIAL





EYE LEVEL VIEW 08 LOOKING WEST FROM ALF TO HOTEL





EYE LEVEL VIEW 25 MEDICAL COMMERCIAL





EYE LEVEL VIEW 22 LOOKING SOUTHWEST TO MULTIFAMILY





BIRDSEYE VIEW 04 LOOKING WEST TO RETAIL





BIRDSEYE VIEW 04 LOOKING WEST TO RETAIL





EYE LEVEL VIEW 13 OF RETAIL





EYE LEVEL VIEWS 16 AND 03 LOOKING WEST TO RETAIL





ADMINISTRATIVE DRAFT

**INITIAL STUDY/  
MITIGATED NEGATIVE DECLARATION**

**HANFORD PLACE PROJECT  
CITY OF HANFORD, CALIFORNIA**



**LSA**

March 2023

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**ADMINISTRATIVE DRAFT**

**INITIAL STUDY/  
MITIGATED NEGATIVE DECLARATION**

**HANFORD PLACE PROJECT  
CITY OF HANFORD, CALIFORNIA**

Submitted to:

QK  
907 East Main Street  
Visalia, California 93292

Prepared for:

City of Hanford  
317 N. Douty Street  
Hanford, California 93230

Prepared by:

LSA  
2656 Alluvial Avenue, Suite 172  
Clovis, California 93611  
(559) 490-1210

Project No. 20230872



March 2023



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## LIST OF ABBREVIATIONS AND ACRONYMS

|                   |                                                           |
|-------------------|-----------------------------------------------------------|
| AAQS              | Ambient Air Quality Standard                              |
| AB                | Assembly Bill                                             |
| BAAQMD            | Bay Area Air Quality Management District                  |
| Basin Plan        | Water Quality Control Plan                                |
| BMP               | Best Management Practices                                 |
| C-H               | Highway Commercial                                        |
| C-S               | Service Commercial                                        |
| CalEEMod          | California Emissions Estimator Model                      |
| CALGreen          | California Green Building Standards Code                  |
| Caltrans          | California Department of Transportation                   |
| CAP               | Climate Action Plan                                       |
| CARB              | California Air Resource Board                             |
| CDFW              | California Department of Fish and Wildlife                |
| CEC               | California Energy Commission                              |
| CEQA              | California Environmental Quality Act                      |
| CH <sub>4</sub>   | methane                                                   |
| City              | City of Hanford                                           |
| CNPS              | California Native Plant Society                           |
| CO                | carbon monoxide                                           |
| CO <sub>2</sub>   | carbon dioxide                                            |
| CO <sub>2</sub> e | CO <sub>2</sub> equivalents                               |
| County            | Kings County                                              |
| CRPR              | California Rare Plant Rank                                |
| dB                | decibel                                                   |
| DCP               | Dust Control Plan                                         |
| FHWA              | Federal Highway Administration                            |
| GAMAQI            | Guidance for Assessing and Mitigating Air Quality Impacts |
| GHG               | Greenhouse gas                                            |
| GWP               | Global Warming Potential                                  |

---

|                  |                                                   |
|------------------|---------------------------------------------------|
| HCM              | Highway Capacity Manual                           |
| HFCs             | Hydrofluorocarbons                                |
| IS/MND           | Initial Study/Mitigated Negative Declaration      |
| ITE              | Institute of Transportation Engineers             |
| $L_{dn}$         | day-night average level                           |
| LEED             | Leadership in Energy and Environmental Design     |
| $L_{eq}$         | equivalent continuous sound level                 |
| LOS              | Level of Service                                  |
| MLD              | Most Likely Descendant                            |
| mpg              | miles per gallon                                  |
| $N_2O$           | Nitrous oxide                                     |
| NAAQS            | National Air Quality Standards                    |
| $NO_2$           | nitrogen dioxide                                  |
| $NO_x$           | nitrogen oxide                                    |
| NPDES            | National Pollutant Discharge Elimination System   |
| NWIC             | Northwest Information Center                      |
| O                | Office Zoning                                     |
| $O_3$            | ozone                                             |
| Pb               | lead                                              |
| PFCs             | perfluorocarbons                                  |
| $PM_{10}$        | respirable particulate matter                     |
| $PM_{2.5}$       | fine particulate matter                           |
| PPV              | peak particle velocity                            |
| proposed project | Hanford Place Project                             |
| PUD              | Planned Unit Development                          |
| R-H              | High-Density Residential Zoning                   |
| ROG              | reactive organic gases                            |
| RPS              | State of California Renewable Portfolio Standards |
| RWQCB            | Regional Water Quality Control Board              |
| SB               | Senate Bill                                       |
| $SF_6$           | sulfur hexafluoride                               |

---

|                 |                                                 |
|-----------------|-------------------------------------------------|
| SJVAB           | San Joaquin Valley Air Basin                    |
| SJVAPCD         | San Joaquin Valley Air Pollution Control        |
| SO <sub>2</sub> | sulfur dioxide                                  |
| SR-198          | State Route 198                                 |
| SRA             | State responsibility area                       |
| State           | State of California                             |
| SWPPP           | Storm Water Pollution Prevention Plan           |
| TACs            | toxic air contaminants                          |
| UCMP            | University of California Museum of Paleontology |
| USGS            | United States Geological Survey                 |
| UWMP            | Urban Water Management Plan                     |
| VMT             | vehicle miles traveled                          |
| ZE              | zero emission                                   |



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## 1.0 PROJECT INFORMATION

**1. Project Title:**

Hanford Place Project

**2. Lead Agency Name and Address:**

City of Hanford  
317 N. Douty Street  
Hanford, CA 93230

**3. Contact Person and Phone Number:**

Gabrielle Myers, Senior Planner  
City of Hanford Community Development, Planning Division  
(559) 585-2578

**4. Project Location:**

The project site is located between State Route 198 (SR-198) and the San Joaquin Valley Railroad in the City of Hanford (City), in Kings County (County). 5th Street cuts through the project site in an east/west direction and Campus Drive cuts through the project in a north/south direction. In addition, the Peoples Ditch runs through the project site.

**5. Project Sponsor's Name and Address:**

Steve Brandt  
QK  
901 East Main Street  
Visalia, CA 93292

**6. General Plan Designation:**

Highway Commercial (C-H)

**7. Zoning:**

Highway Commercial (C-H)

**8. Description of Project:**

The proposed project would develop a medical and mixed-use development including the construction of 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements.

**9. Surrounding Land Uses and Setting:**

The project site is located in an area with a mix of land uses, including residential, commercial, and medical uses. Adjacent parcels consist mostly of low-density residential and commercial uses, with several undeveloped lots located north of the project site.

**10. Other Public Agencies Whose Approval is Required (e.g., permits, financial approval, or participation agreements):**

The proposed project would include, but not be limited to, the following regulatory requirements:

- City (e.g., approval of General Plan Amendment, Zone Change, and building permits)
- Central Valley Regional Water Quality Control Board Storm Water Pollution Prevention Plan
- San Joaquin Valley Air Pollution Control District (e.g., Dust Control Plan Approval letter and compliance with Rule 9510 – Indirect Source Review)
- California Department of Fish and Wildlife Notification of Streambed Alteration pursuant to Section 1602 of the California Fish and Game Code

**11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resource Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?**

California Native American tribes traditionally and culturally affiliated with the project site and area were notified of the proposed project on August 5, 2020. Follow-up contact by email and telephone was completed on August 13, 2020. No responses have been received to date.



## 2.0 PROJECT DESCRIPTION

The following describes the proposed Hanford Place Project (proposed project). This section includes a summary description of the project location and existing site characteristics, required approvals, and entitlements. The City is the lead agency for review of the project under the California Environmental Quality Act (CEQA).

### 2.1 PROJECT SITE

The following section describes the location and characteristics of the project site. This section also provides a brief overview of the existing land uses within the vicinity of the project site.

#### 2.1.1 Location

The 39.23-acre vacant project site is comprised of four parcels and is located between State Route 198 (SR-198) and the San Joaquin Valley Railroad in the City, in Kings County (County). 5th Street cuts through the project site in an east/west direction and Campus Drive cuts through the project in a north/south direction. In addition, the Peoples Ditch runs through the project site.

The project site is generally bound to the north by the San Joaquin Valley Railroad and existing mixed-use structures, including commercial, medical, retail, and some residential uses, to the east by commercial land uses, to the south by SR-198, and to the west by commercial land uses. Regional access to the site is provided by SR-198, which is located adjacent to the southern border of the project site. Figure 1 shows the site's regional and local context. Figure 2 depicts an aerial photograph of the project site and surrounding land uses.

#### 2.1.2 Existing Setting

The project site is primarily flat and is fallow and disturbed with no existing structures. The project site was previously used for agriculture, consistent with many of the surrounding lands in the region. The project site is located in an area with a mix of land uses, including residential, commercial, and medical uses. Adjacent parcels consist mostly of low-density residential and commercial uses, with several undeveloped lots located north of the project site.

The General Plan designation for the project site is currently C-H and the current zoning designation for the project site is C-H.

### 2.2 PROPOSED PROJECT

This section provides a description of the proposed project as identified in the project applicant's proposal materials and site plan, dated September 30, 2019.<sup>1</sup> The proposed project would develop a medical and mixed-use development and would construct 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical

---

<sup>1</sup> The Hanford Group. 2019. *Hanford Place Medical and Mixed Use-Property Proposal*.

office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements.

The proposed project would include the extension of Glendale Avenue, 5th Street, and Campus Drive, which would be dedicated as public right of way. The proposed project would also construct a roundabout, which would also be dedicated as public right of way. As part of the project, Glendale Avenue would also be realigned and any portion of existing right of way not used would be abandoned. In addition, the proposed project would convert the Peoples Ditch to an underground pipeline. Individual project components are further described below.

### 2.2.1 Project Characteristics

The proposed project would include the following: a 22,525-square-foot ambulatory surgery center; a 12,445-square-foot specialty clinic; two 12,445-square-foot medical office buildings; a 12,445-square-foot psychiatric health facility; a 100,000-square-foot, a four-story 105-room hotel with a conference center and pool; a 35,000-square-foot nursing college; a 54,611-square-foot skilled nursing facility; a 34,480-square-foot memory care facility; a 34,380-square-foot assisted living facility; a three-story 90-unit multi-family apartment; 41,500 square feet of medical/commercial uses; and a 5-acre bio infiltration basin. Table 2.A depicts the proposed buildings and their characteristics. Figure 3 shows the project site plan.

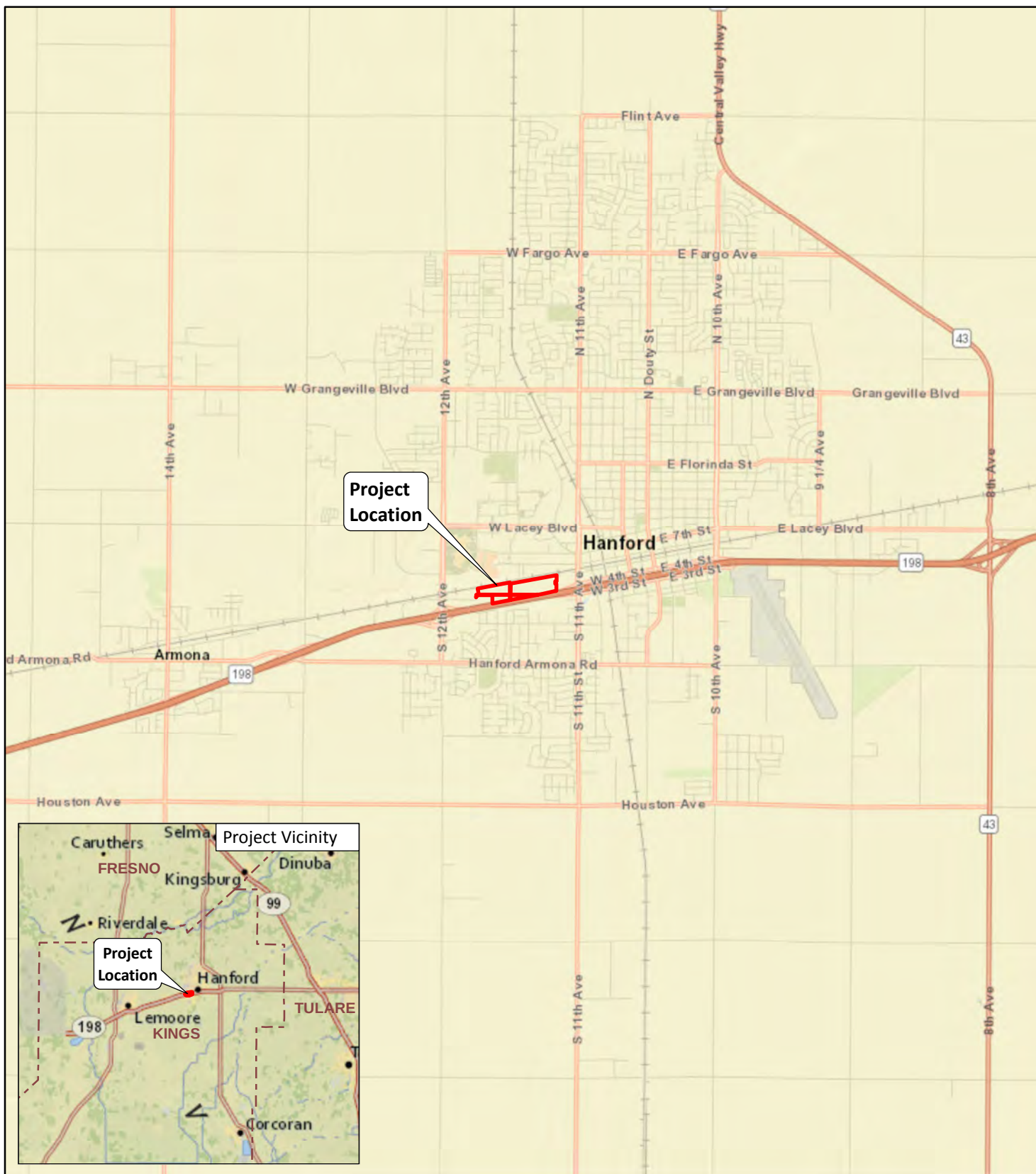
**Table 2.A: Building Characteristics**

| Building                    | Total Square Feet | Number of Units | Stories |
|-----------------------------|-------------------|-----------------|---------|
| Ambulatory Surgery Center   | 22,525            | -               | 2       |
| Specialty Clinic            | 12,445            | -               | 1       |
| Medical Office Building     | 24,890            | 2 buildings     | 1       |
| Psychiatric Health Facility | 12,445            | -               | 1       |
| Hotel and Conference Center | 100,000           | 105 rooms       | 4       |
| Nursing College             | 35,000            | 8-10 classrooms | 2       |
| Skilled Nursing Facility    | 54,611            | 59 units        | 2       |
| Memory Care                 | 34,480            | 40 units        | 1       |
| Assisted Living Facility    | 34,380            | -               | 1       |
| Multi-Family Apartment      | 76,500            | 90 units        | 3       |
| Medical/Commercial          | 41,500            | -               | 1       |

Source: The Hanford Group (2019).

As identified above, the proposed project would include a total of 90 residential units (approximately 76,500 square feet). Units would average 850 square feet, with 72 two-bedroom, two-bathroom units (80 percent of units), 14 one-bedroom, one-bathroom units (15 percent), and 4 three-bedroom, two-bathroom units (5 percent). In addition, the proposed project would provide outdoor space and amenities, including a dog park and a pool.

The proposed project would comply with the latest CALGreen standard building measures and Title 24 standards with some buildings being constructed to meet Leadership in Energy and Environmental Design (LEED) certifications. In addition, approximately 35 to 40 percent of the project's square footage would be covered by solar.



LSA

LEGEND

Project Site



0 0.5 1  
MILES

SOURCE: Esri World Street Map (2020); National Geographic (2020).

I:\EPI2001\GIS\Maps\Figure 1\_Regional Location.mxd (4/13/2020)

FIGURE 1

*Hanford Place Project  
Hanford, Kings County, California  
Regional Location*



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LSA

LEGEND

Project Site



0 250 500  
FEET

SOURCE: Google Aerial Imagery (2020).

I:\EPI2001\GIS\Maps\Figure 2\_Project Location.mxd (5/11/2020)

FIGURE 2

*Hanford Place Project*  
*Hanford, Kings County, California*  
**Project Location**

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FIGURE 3

LSA



SOURCE: LANGDON WILSON INTERNATIONAL, 2020.

FRE10\P:\EPI2001 Hanford Place\PRODUCTS\Figure\_3.ai (4/22/2020)

Hanford Place Project  
Hanford, Kings County, California  
Site Plan

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### 2.2.2 General Plan and Zoning Designation

The General Plan designation for the project site is currently Highway Commercial; however, the project would amend the General Plan to Service Commercial and High-Density Residential. In addition, the current zoning designation for the project site is C-H; however, the project would require a rezone to Service Commercial (C-S) and High-Density Residential (R-H) with a Planned Unit Development (PUD) overlay that would allow uses allowed on the entire project site. This zoning designation and PUD would allow uses from both zones to be constructed anywhere on the project site, which could result in location changes of buildings shown on Figure 3.

### 2.2.3 Access and Circulation

Vehicular access to the site would be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right of way. The proposed project would also construct a roundabout, which would also be dedicated as public right of way and would be constructed to Caltrans or City-approved standards. As part of the project, Glendale Avenue would be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle would be removed, and Glendale Avenue would be realigned using speed-specific design curves. Any new portions of Glendale Avenue would be dedicated as public right of way and any portion of existing right of way not used would be abandoned. 5th Street would be extended starting at the existing alignment before realigning to the roundabout. In addition, the proposed project would provide 1,466 parking spaces throughout the project site.

### 2.2.4 Open Space and Landscaping

Consistent with City requirements, open space and drought-tolerant landscaping would be provided throughout the project site.

### 2.2.5 Utilities

Utilities required to serve the proposed project would include water, sanitary sewer, storm water drainage, electricity, natural gas, and telecommunications infrastructure. Water service, sewage disposal, and refuse collection would be provided by the City. In addition, all City utilities (i.e., water, sewer, and storm drain) would be constructed within the proposed right of way. Storm drainage would be collected by an underground conveyance system and delivered to the onsite bio infiltration basin. The basin would be privately held by the owners and would collect both the proposed project and the City right of way. All storm drain facilities would be designed to City standards.

The proposed project would also convert the Peoples Ditch to a 66-inch-diameter below-ground pipeline where the ditch currently exists and would terminate approximately 20 feet short of the existing pipeline that runs under SR-198. The depth of the below-ground pipeline would be between two and six feet.

The proposed project would also require electrical, natural gas, telephone, and cable improvements. Electricity would be provided by Southern California Edison; natural gas would be provided by



Southern California Gas; and telephone services would be provided by AT&T. The extent of work required for utilities and gas would be determined during final project design.

#### **2.2.6 Construction**

The proposed project would be constructed in three phases and is anticipated to begin March 2024. Construction is anticipated to last approximately 3 years. The proposed project would comply with City standards, including the City's current building code, landscape standards, and lighting standards. In addition, the proposed project would be graded similar to other developments throughout the City. The proposed project would require between 50,000 to 90,000 cubic yards of soil moved throughout the site and may require re-compaction in place and over excavation. Over excavation would be between 30,000 and 60,000 cubic yards of soil.

### 3.0 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist in Chapter 3.0.

- |                                                    |                                                             |                                                             |
|----------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Aesthetics                | <input type="checkbox"/> Agriculture and Forestry Resources | <input type="checkbox"/> Air Quality                        |
| <input type="checkbox"/> Biological Resources      | <input type="checkbox"/> Cultural Resources                 | <input type="checkbox"/> Energy                             |
| <input type="checkbox"/> Geology/Soils             | <input type="checkbox"/> Greenhouse Gas Emissions           | <input type="checkbox"/> Hazards & Hazardous Materials      |
| <input type="checkbox"/> Hydrology/Water Quality   | <input type="checkbox"/> Land Use/Planning                  | <input type="checkbox"/> Mineral Resources                  |
| <input type="checkbox"/> Noise                     | <input type="checkbox"/> Population/Housing                 | <input type="checkbox"/> Public Services                    |
| <input type="checkbox"/> Recreation                | <input type="checkbox"/> Transportation                     | <input type="checkbox"/> Tribal Cultural Resources          |
| <input type="checkbox"/> Utilities/Service Systems | <input type="checkbox"/> Wildfire                           | <input type="checkbox"/> Mandatory Findings of Significance |

### 3.1 DETERMINATION

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have a “Potentially Significant Impact” or “Potentially Significant Unless Mitigated” impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☒ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

Date

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## 4.0 CEQA ENVIRONMENTAL CHECKLIST

### 4.1 AESTHETICS

|                                                                                                                                                                                                                                                                                                                                                                               | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|-------------------------------------|
| Except as provided in Public Resources Code Section 21099, would the project:                                                                                                                                                                                                                                                                                                 |                                      |                                                             |                                     |                                     |
| a. Have a substantial adverse effect on a scenic vista?                                                                                                                                                                                                                                                                                                                       | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway                                                                                                                                                                                                                       | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?                                                                                                                                                                                                                                                         | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

#### a. *Would the project have a substantial effect on a scenic vista?*

The vacant, undeveloped project site is located in an area with a mix of land uses, including residential, commercial, and medical uses. Adjacent parcels consist mostly of low-density residential and commercial uses, with several undeveloped lots located north of the project site. The Peoples Ditch, an irrigation canal dug in the 1870s, runs through the project site. There are no significant trees, rock outcroppings, and/or historic buildings located on the subject property that have been identified as important scenic resources. Therefore, the proposed project would not diminish the scenic views of the project area and would likewise not block or impede surrounding views. Therefore, the proposed project would not result in a substantial adverse effect on a scenic vista. This impact would be less than significant, and no mitigation is required.

#### b. *Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*

The California Department of Transportation (Caltrans) manages the State Scenic Highway Program. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been officially designated. No officially designated State scenic highways are located in the City. The nearest State scenic highway to the City is SR-198 east of SR-99.<sup>2</sup> Although the project site is located adjacent to SR-198, the portion that is designated as a State scenic highway is located approximately 3.2 miles east of the project site. The project site would not

<sup>2</sup> California Department of Transportation (Caltrans). 2017. *California Scenic Highways*. February. Website: [www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=f0259b1ad0fe4093a5604c9b838a486a](http://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=f0259b1ad0fe4093a5604c9b838a486a) (accessed March 2023).

be visible from this scenic roadway. Therefore, implementation of the proposed project would not affect scenic resources within view of a State or local scenic highway, and there would be no impact, and no mitigation is required.

- c. In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

The proposed project would develop a medical and mixed-use development and would construct 15 buildings consisting of medical outpatient clinic services, hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements.

The Land Use and Community Design Element of the City's General Plan<sup>3</sup> states that through community design, the City can build and sustain an urban fabric that strengthens its assets and strives to bring coherence and an ongoing identity to this growing community. High-quality design contributes to memorable, vibrant places where people enjoy spending time. Engaging buildings and public spaces include pedestrian-friendly walkways and entries, open spaces, attractive streets, and efficient parking. In addition, the Land Use and Community Design Element states that the General Plan directs growth toward walkable and mixed-use areas that are planned to integrate housing with regional transit, employment, services, and amenities. The proposed project would develop a mixed-use, infill development consistent with the goals of the Land Use and Community Design Element.

The proposed project would require a rezone from C-H to C-S and R-H. Although the proposed project would require a General Plan Amendment and a Zone Change, the proposed uses would be consistent with the proposed General Plan designations and zones. Therefore, the proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings and would not conflict with applicable zoning and other regulations governing scenic quality. This impact would be less than significant, and no mitigation is required.

- d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

Glare is the result of improperly aimed or blocked lighting sources that are visible against a dark background such as the night sky. Glare may also refer to the sensation experienced looking into an excessively bright light source that causes a reduction in the ability to see or causes discomfort. Glare generally does not result in illumination of off-site locations but results in a visible source of light viewable from a distance.

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<sup>3</sup> Hanford, City of. 2017. *General Plan – City of Hanford, California*. April. Website: [cms6.revize.com/revize/hanfordca/document\\_center/Planning/General%20Plan/2035%20General%20Plan%20Policy%20Document.pdf](https://cms6.revize.com/revize/hanfordca/document_center/Planning/General%20Plan/2035%20General%20Plan%20Policy%20Document.pdf) (accessed March 2023).

Implementation of the proposed project would create new lighting sources on the project site associated with the new buildings, street and parking lot lighting, and security lighting. All project lighting is required to meet all applicable lighting standards in the City's Municipal Code. As required by Section 17.50.140 of the Municipal Code, all lights and light fixtures, except public streetlights, shall be located, aimed or shielded so as to minimize light trespassing across property boundaries or skyward and no lights shall flash, revolve, blink or otherwise resemble a traffic control signal or operate in such a fashion to create a hazard for passing traffic. Building mounted lighting fixtures shall be attached only to the walls of the building. The top of a light fixture attached to a building wall shall not be higher than the top of the building parapet or the top of the roof eave, whichever is lower and canopy ceiling light fixtures shall be recessed or the sides of the lens area shall be shielded in order to eliminate emission of horizontal light. In addition, mercury vapor lamps shall be a fully shielded fixture with all light directed on-site and freestanding light fixtures shall not exceed 18 feet in height.

Although the proposed project would increase the overall intensity of on-site land uses and associated lighting, the increase in lighting would not result in substantial increases in light intensity at off-site locations. In addition, light intensity diminishes rapidly as an observer moves away from the light source. As such, the intensity of project-related lighting would be concentrated on site with little potential to create perceptible changes in ambient lighting intensity at off-site, light-sensitive locations.

Daytime glare can result from natural sunlight reflecting from a shiny surface that would interfere with the performance of an off-site activity, such as the operation of a motor vehicle. Reflective surfaces can be associated with window glass, polished surfaces, and solar panels. The design of the proposed buildings, parking lot, and solar panels would be designed to be consistent with the City's standards to avoid the creation of intrusive glare within the immediate project area.

Nighttime lighting and glare sources from the proposed project could also include lighting from interior and exterior building lighting, security lighting, signage, parking lot lighting, and vehicle headlights. The nighttime glare produced by these sources would be similar to the existing nighttime glare produced by surrounding residential, commercial, and medical uses and would not result in enough glare to be considered substantial or affect nighttime views because lighting would be designed to be consistent with the development regulations outlined in the Municipal Code.

For these reasons, the proposed project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the surrounding urban area, and project impacts would be less than significant. No mitigation is required.



## 4.2 AGRICULTURE AND FORESTRY RESOURCES

|                                                                                                                                                                                                                                                                                            | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact | No<br>Impact                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|------------------------------------|-------------------------------------|
| Would the project:                                                                                                                                                                                                                                                                         |                                      |                                                             |                                    |                                     |
| a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?                                             | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>           | <input checked="" type="checkbox"/> |
| b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?                                                                                                                                                                                                       | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>           | <input checked="" type="checkbox"/> |
| c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>           | <input checked="" type="checkbox"/> |
| d. Result in the loss of forest land or conversion of forest land to non-forest use?                                                                                                                                                                                                       | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>           | <input checked="" type="checkbox"/> |
| e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?                                                                               | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>           | <input checked="" type="checkbox"/> |

*a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*

The project site is classified as Grazing Land.<sup>4</sup> The project site is not zoned for agricultural uses and is not enrolled in a Williamson Act Contract. The State Department of Conservation classifies the project site as Non-Enrolled Land. The project site is not located on land that is designated as Prime Farmland or Farmland of State Importance. In addition, the project site is currently vacant and is not zoned for agricultural uses. Therefore, implementation of the proposed project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the California Important Farmland Map, to a non-agricultural use. There would be no impact, and no mitigation is required.

*b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?*

The General Plan designation for the project site is currently Highway Commercial; however, the project would amend the General Plan to Service Commercial and High-Density Residential. In addition, the current zoning designation for the project site is C-H; however, the project would require a rezone to C-S and R-H. The project site is classified as Grazing Land and the land is not enrolled in a Williamson Act contract. Therefore, the proposed project would have no impact on

<sup>4</sup> California Department of Conservation. 2016. *California Important Farmland Finder*. Website: [maps.conservation.ca.gov/DLRP/CIFF/](https://maps.conservation.ca.gov/DLRP/CIFF/) (accessed March 2023).

zoning designations for agricultural and farmland use or land currently under a Williamson Act contract, and no mitigation is required.

- c. Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?*

The project site is not zoned for, nor would it require the rezoning of, any existing parcels or land use designations, including forest land or timberland uses. In addition, there is no forest land or timberland subject to the Public Resources Code within the vicinity of the project site. Therefore, the proposed project would have no impact to forestland or timberland, and no mitigation is required.

- d. Would the project result in the loss of forest land or conversion of forestland to non-forest use?*

See Response 4.2.c. The proposed project would not convert forest land to non-forest use and would not result in the loss or conversion of forest land to a non-forest use, and no mitigation is required.

- e. Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?*

As stated previously, the project site is currently vacant, and therefore would not convert farmland to a non-agricultural use. In addition, the project site would not contribute to environmental changes that could result in conversion of farmland to non-agricultural use. Therefore, no impacts to farmland or forest land would occur, and no mitigation is required.

### 4.3 AIR QUALITY

|                                                                                                                                                                                                   | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                                                                                                |                                      |                                                             |                                     |                          |
| a. Conflict with or obstruct implementation of the applicable air quality plan?                                                                                                                   | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c. Expose sensitive receptors to substantial pollutant concentrations?                                                                                                                            | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?                                                                                 | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

The proposed project is located within the City of Hanford. Hanford is part of the San Joaquin Valley Air Basin (SJVAB), which is within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAPCD is responsible for air quality regulation within the eight county San Joaquin Valley region.

Both the State of California (State) and the federal government have established health-based Ambient Air Quality Standards (AAQS) for six criteria air pollutants: carbon monoxide (CO), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), lead (Pb), and suspended particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>). The SJVAB is designated as non-attainment for O<sub>3</sub> and PM<sub>2.5</sub> for federal standards and non-attainment for O<sub>3</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> for State standards.

Air quality monitoring stations are located throughout the nation and maintained by the local air districts and State air quality regulating agencies. Data collected at permanent monitoring stations are used by the USEPA to identify regions as “attainment” or “nonattainment” depending on whether the regions meet the requirements stated in the applicable National Air Quality Standards (NAAQS). Nonattainment areas are imposed with additional restrictions as required by the USEPA. In addition, different classifications of attainment, such as marginal, moderate, serious, severe, and extreme, are used to classify each air basin in the State on a pollutant-by-pollutant basis. The classifications are used as a foundation to create air quality management strategies to improve air quality and comply with the NAAQS. The SJVAB attainment statuses for each of the criteria pollutants are listed in Table 4.A.



**Table 4.A: SJVAB Air Quality Attainment Status**

| Pollutant         | Federal                       | State                   |
|-------------------|-------------------------------|-------------------------|
| Ozone (1-hour)    | No Federal Standard           | Nonattainment/Severe    |
| Ozone (8-hour)    | Nonattainment/Extreme         | Nonattainment           |
| PM <sub>10</sub>  | Attainment                    | Nonattainment           |
| PM <sub>2.5</sub> | Nonattainment                 | Nonattainment           |
| Carbon Monoxide   | Attainment/Unclassified       | Attainment/Unclassified |
| Nitrogen Dioxide  | Attainment/Unclassified       | Attainment              |
| Lead              | No Designation/Classification | Attainment              |
| Sulfur Dioxide    | Attainment/Unclassified       | Attainment              |
| Sulfates          | No Federal Standard           | Attainment              |
| Hydrogen Sulfide  | No Federal Standard           | Unclassified            |

Source: San Joaquin Valley Air Pollution Control District (2016).

*a. Would the project conflict with or obstruct implementation of the applicable air quality plan?*

An air quality plan describes air pollution control strategies to be implemented by a city, county, or region classified as a non-attainment area. The main purpose of the air quality plan is to bring the area into compliance with the requirements of the federal and State air quality standards. The SJVAPCD *Guidance for Assessing and Mitigating Air Quality Impacts* (GAMAQI)<sup>5</sup> indicates that projects that do not exceed regional criteria pollutant emission thresholds would not conflict or obstruct the implementation plan.

This analysis used two tests to determine if the project conflicts or obstructs the applicable air quality plans. First, if the project would result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations or delay timely attainment of air quality standards or the interim emission reductions specified in the air quality plans. Second, if the project would comply with applicable control measures in the air quality plans.

**Contribution to Air Quality Violations.** A measure for determining if the project is consistent with the air quality plans is if the project would not result in an increase in the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the air quality plans. Regional air quality impacts and attainment of standards are the result of the cumulative impacts of all emission sources within the air basin. Individual projects are generally not large enough to contribute measurably to an existing violation of air quality standards. Therefore, the cumulative impact of the project is based on its cumulative contribution. Because of the region's nonattainment status for O<sub>3</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub>—if project-generated emissions of either of the O<sub>3</sub> precursor pollutants (nitrogen oxides [NO<sub>x</sub>], reactive organic gases [ROG]), PM<sub>10</sub>, or PM<sub>2.5</sub> would exceed SJVAPCD significance thresholds—then the project would be considered to contribute to violations of the applicable standards and conflict with the attainment plans.

<sup>5</sup> San Joaquin Valley Air Pollution Control District. 2015. CEQA, Guidance/Policies/Rules, Guidance for Assessing and Mitigating Air Quality Impacts. March 19. Website: [www.valleyair.org/transportation/ceqa\\_idx.htm](http://www.valleyair.org/transportation/ceqa_idx.htm) (accessed March 2023).

As discussed in Response 4.3.b below, emissions of ROG, NO<sub>x</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub> associated with construction and operation of the proposed project would not exceed SJVAPCD significance thresholds. In addition, the proposed project would not result in CO hotspots that would violate CO standards. Therefore, the proposed project would not contribute to air quality violations.

**Compliance with Applicable Control Measures.** A description of rules and regulations that apply to this project is provided below.

Rule 9510 (Indirect Source Review) is a control measure in the 2006 PM<sub>10</sub> Plan that requires NO<sub>x</sub> and PM<sub>10</sub> emission reductions from development projects in the SJVAB. The NO<sub>x</sub> emission reductions help reduce the secondary formation of PM<sub>10</sub> in the atmosphere (and also reduce the formation of ozone. Reductions in directly emitted PM<sub>10</sub> reduce particles such as dust, soot, and aerosols. Rule 9510 is also a control measure in the 2022 Plan for the 2015 8-Hour Ozone Standard. Developers of projects subject to Rule 9510 must reduce emissions occurring during construction and operational phases through on-site measures or pay off-site mitigation fees. The proposed project is required to comply with Rule 9510.

Regulation VIII (Fugitive PM<sub>10</sub> Prohibitions) is a control measure that is one main strategies from the 2006 PM<sub>10</sub> Plan for reducing the PM<sub>10</sub> emissions that are part of fugitive dust. Projects over 10 acres are required to file a Dust Control Plan (DCP) containing dust control practices sufficient to comply with Regulation VIII. The proposed project is required to prepare a DCP to comply with Regulation VIII.

Other control measures that apply to the proposed project are Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operation) that requires reductions in volatile organic compounds (VOC) during paving and Rule 4601 (Architectural Coatings) that limits the VOC content of all types of paints and coatings sold in the SJVAB. These regulations are enforced at the manufacturing level and at point of sale, not at the project level.

The proposed project would comply with all applicable SJVAPCD rules and regulations. Therefore, the proposed project would comply with this criterion and would not conflict with or obstruct implementation of the applicable air quality attainment plan.

**Conclusion.** The proposed project's emissions would be less than significant for all criteria pollutants and would not result in inconsistency with applicable air quality plans. The proposed project would comply with applicable air quality plan control measures and would not conflict with or obstruct their implementation; therefore, the proposed project is consistent with the applicable air quality plans, and the impact would be less than significant.

*b. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?*

The SJVAB is designated as non-attainment for O<sub>3</sub> and PM<sub>2.5</sub> for federal standards and non-attainment for O<sub>3</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> for State standards. SJVAPCD nonattainment status is attributed to the region's development history. Past, present, and future development projects contribute to

the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

In developing thresholds of significance for air pollutants, the SJVAPCD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions.

To result in a less than significant impact, the following criteria must be true: 1) regional analysis: emissions of nonattainment pollutants must be below SJVAPCD regional significance thresholds; 2) summary of projections: the project must be consistent with current air quality attainment plans including control measures and regulations; and 3) cumulative health impacts: the project must result in less than significant cumulative health effects from the nonattainment pollutants. The following analysis assesses the potential project-level construction- and operation-related air quality impacts.

**Short-Term Construction Emissions.** During construction, short-term degradation of air quality may occur due to the release of particulate matter emissions (i.e., fugitive dust) generated by grading, hauling, and other activities. Emissions from construction equipment are also anticipated and would include CO, NO<sub>x</sub>, ROG, directly-emitted particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), and toxic air contaminants (TACs) such as diesel exhaust particulate matter.

Site preparation and project construction would involve grading, paving, and other activities. Construction-related effects on air quality from the proposed project would be greatest during the site preparation phase due to the disturbance of soils. If not properly controlled, these activities would temporarily generate particulate emissions. Sources of fugitive dust would include disturbed soils at the construction site. Unless properly controlled, vehicles leaving the site would deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. PM<sub>10</sub> emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM<sub>10</sub> emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of operating equipment. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Water or other soil stabilizers can be used to control dust, resulting in emission reductions of 50 percent or more. SJVAPCD Regulation VIII is designed to reduce PM<sub>10</sub> emissions generated by human activity. The SJVAPCD has established Regulation VIII measures for reducing fugitive dust emissions (PM<sub>10</sub>). With the implementation of Regulation VIII measures, fugitive dust emissions from construction activities would not result in adverse air quality impacts.

In addition to dust-related PM<sub>10</sub> emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO<sub>2</sub>, NO<sub>x</sub>, ROGs and some soot particulate (PM<sub>2.5</sub>



and PM<sub>10</sub>) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Construction emissions were estimated for the project using the California Emissions Estimator Model, version 2022.1 (CalEEMod) as recommended by the SJVAPCD. The project was assumed to begin construction March 2024 and last approximately 3 years. The proposed project would require between 50,000 to 90,000 cubic yards of soil moved throughout the site and may require re-compaction in place and over excavation. Over excavation would be between 30,000 and 60,000 cubic yards of soil; as such, this analysis assumes that 60,000 cubic yards of soil would be off-hauled. This analysis also assumes the use of Tier 2 construction equipment. Other construction details are not yet known; therefore, default assumptions (e.g., construction fleet activities and worker and vendor trips) from CalEEMod were used.

Construction-related emissions for each year of construction are presented in Table 4.B. CalEEMod output sheets are included in Appendix A.

**Table 4.B: Project Construction Emissions**

| Year                                         | Emissions (tons per year) |                 |            |                  |                   |
|----------------------------------------------|---------------------------|-----------------|------------|------------------|-------------------|
|                                              | ROG                       | NO <sub>x</sub> | CO         | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Construction 2024                            | 0.2                       | 3.7             | 3.3        | 0.5              | 0.2               |
| Construction 2025                            | 0.2                       | 2.8             | 3.3        | 0.4              | 0.2               |
| Construction 2026                            | 0.3                       | 2.5             | 2.8        | 0.3              | 0.1               |
| Construction 2027                            | 1.2                       | <0.1            | 0.1        | <0.1             | <0.1              |
| <b>Total Construction Emissions</b>          | <b>1.9</b>                | <b>9.0</b>      | <b>9.4</b> | <b>1.2</b>       | <b>0.5</b>        |
| <b>Highest Annual Construction Emissions</b> | <b>1.2</b>                | <b>3.7</b>      | <b>3.3</b> | <b>0.5</b>       | <b>0.2</b>        |
| Significance Thresholds                      | 10.00                     | 10.00           | 100.00     | 15.00            | 15.00             |
| <b>Exceed Threshold?</b>                     | <b>No</b>                 | <b>No</b>       | <b>No</b>  | <b>No</b>        | <b>No</b>         |

Source: LSA (March 2023).

As shown in Table 4.B construction emissions associated with the project would not exceed SJVAPCD thresholds for ROG, NO<sub>x</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions. Therefore, construction of the proposed project would not result in a cumulatively considerable net increase of PM<sub>10</sub> or any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standards and impacts would be less than significant.

**Long-Term (Operational) Emissions.** Long-term air pollutant emission impacts are those associated with mobile sources (e.g., vehicle trips), energy sources (e.g., electricity and natural gas), and area sources (e.g., architectural coatings and the use of landscape maintenance equipment) related to the proposed project.

PM<sub>10</sub> emissions result from running exhaust, tire and brake wear, and the entrainment of dust into the atmosphere from vehicles traveling on paved roadways. Entrainment of PM<sub>10</sub> occurs when

vehicle tires pulverize small rocks and pavement, and the vehicle wakes generate airborne dust. The contribution of tire and brake wear is small compared to the other PM emission processes. Gasoline-powered engines have small rates of particulate matter emissions compared with diesel-powered vehicles.

Energy source emissions result from activities in buildings for which electricity and natural gas are used. The quantity of emissions is the product of usage intensity (i.e., the amount of electricity or natural gas) and the emission factor of the fuel source. Major sources of energy demand include building mechanical systems, such as heating and air conditioning, lighting, and plug-in electronics, such as refrigerators or computers. Greater building or appliance efficiency reduces the amount of energy for a given activity and thus lowers the resultant emissions. The emission factor is determined by the fuel source, with cleaner energy sources, like renewable energy, producing fewer emissions than conventional sources.

Typically, area source emissions consist of direct sources of air emissions located at the project site, including architectural coatings and the use of landscape maintenance equipment. Area source emissions associated with the project would include emissions from the use of landscaping equipment and the use of consumer products.

Emission estimates for operation of the project were calculated using CalEEMod. Model results are shown in Table 4.C. Trip generation rates for the project were based on the project's trip generation estimates, as identified in Section 4.17, Transportation. However, as discussed in Section 4.17, Transportation, approximately 41,500 square feet of commercial/office uses is proposed. These uses would generate fewer trips than the 114,000 square feet of commercial/office uses that is analyzed in the proposed project trip generation estimate. The trip generation in CalEEMod was adjusted to reflect 41,500 square feet of commercial/office uses. As such, CalEEMod assumes a total of approximately 5,239 average daily trips (ADT), including 1,393 ADT for the Ambulatory Surgery Center, Specialty Clinic, Medical Office Building, and Psychiatric Health Facility, 682 ADT for the Hotel and Conference Center, 638 ADT for the Nursing College, 662 ADT for the Skilled Nursing Facility, Memory Care, Assisted Living Facility, 576 ADT for the Multi-Family Apartments, and 1,287 ADT for the Medical/Commercial uses based on the project's trip generation and taking into account a 10 percent reduction for internal trips. In addition, this analysis assumes the proposed project would be built to current Title 24 building standards. Where project-specific data were not available, default assumptions from CalEEMod were used to estimate project emissions.

The primary emissions associated with the project are regional in nature, meaning that air pollutants are rapidly dispersed on release or, in the case of vehicle emissions associated with the project; emissions are released in other areas of the Air Basin. The annual emissions associated with project operation are identified in Table 4.C for ROG, NO<sub>x</sub>, CO, PM<sub>10</sub>, and PM<sub>2.5</sub>.

**Table 4.C: Project Operation Emissions**

| Source                           | Emissions (tons per year) |                 |             |                  |                   |
|----------------------------------|---------------------------|-----------------|-------------|------------------|-------------------|
|                                  | ROG                       | NO <sub>x</sub> | CO          | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Mobile Source Emissions          | 2.9                       | 2.5             | 14.5        | 1.1              | 0.2               |
| Area Source Emissions            | 2.4                       | 0.1             | 4.3         | 0.3              | 0.3               |
| Energy Source Emissions          | <0.1                      | 0.6             | 0.4         | <0.1             | <0.1              |
| <b>Total Operation Emissions</b> | <b>5.4</b>                | <b>3.2</b>      | <b>19.2</b> | <b>1.5</b>       | <b>0.6</b>        |
| Significance Thresholds          | 10.00                     | 10.00           | 100.00      | 15.00            | 15.00             |
| <b>Exceed Threshold?</b>         | <b>No</b>                 | <b>No</b>       | <b>No</b>   | <b>No</b>        | <b>No</b>         |

Source: LSA (March 2023).

The results shown in Table 4.C indicate the project would not exceed the significance criteria for annual ROG, NO<sub>x</sub>, CO, PM<sub>10</sub> or PM<sub>2.5</sub> emissions. In addition, the application of SJVAPCD Rule 9510, and implementation of the General Plan air quality-related policies would reduce impacts to the extent feasible. The project fulfills other General Plan objectives by increasing development densities and providing infill development in an area surrounded by existing development. As such, operation of the proposed project would not result in a cumulatively considerable net increase of PM<sub>10</sub> or any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standards and impacts would be less than significant.

**Project Health Impacts.** In the 5th District Court of Appeal case *Sierra Club v. County of Fresno (Friant Ranch, L.P.)*, the Court found the project's Environmental Impact Report (EIR) deficient because it did not identify specific health-related effects resulting from the estimated amount of pollutants generated by the project. The ruling stated that the EIR should give a "sense of the nature and magnitude of the 'health and safety problems' caused by a project's air pollution. The EIR should translate the emission numbers into adverse impacts or to understand why such translation is not possible at this time (and what limited translation is, in fact, possible)."

The pollutants of concern in the Friant Ranch ruling were regional criteria pollutants ozone and PM<sub>10</sub>. It is important to note that the potential for localized impacts can be addressed through dispersion modeling. The SJVAPCD includes screening criteria that if exceeded would require dispersion modeling to determine if project emissions would result in a significant health impact. For this project, no significant localized health impacts would occur. Regional pollutants require more complex modeling as described below.

Ozone concentrations are estimated using regional photochemical models because ozone formation is subject to temperature, inversion strength, sunlight, emissions transport over long distances, dispersion, and the regional nature of the precursor emissions. The emissions from individual projects are too small to produce a measurable change in ozone concentrations – it is the cumulative contribution of emissions from existing and new development that is accounted for in the photochemical model. Ozone concentrations vary widely throughout the day and year even with the same amount of daily emissions. The SJVAPCD indicated in an Amicus Brief on Friant Ranch that running the photochemical model with just Friant Ranch emissions (109.5 tons/year NO<sub>x</sub>) is not likely to yield valid information given the relative scale involved. The NO<sub>x</sub> inventory for the San Joaquin Valley is 224 tons per day in 2019 or 81,760 tons per year. Friant Ranch would result in 0.13



percent increase in NO<sub>x</sub> emissions. A project emitting at the SJVAPCD CEQA threshold of 10 tons per year would result in a 0.01 percent increase in NO<sub>x</sub> emissions. Most project emissions are generated by motor vehicle travel distributed on regional roadways miles from the project site, and these emissions are not conducive to project-level modeling.

Emissions throughout the San Joaquin Valley are projected to decline in the coming decade. The SJVAPCD 2022 Ozone Plan predicts NO<sub>x</sub> emissions will decline 72 percent between 2018 and 2037, contributing to the Valley's progress toward attainment of the 2015 8-hour ozone standard levels through implementation of control measures included in the plan. This means that ozone health impacts to residents of the San Joaquin Valley will be lower than currently experienced, and most areas of the San Joaquin Valley will have attained ozone air quality standards. The plan accounts for growth in population at rates projected by the State for the San Joaquin Valley, so only cumulative projects that would exceed regional growth projections would potentially delay attainment and prolong the time and the number of people would experience health impacts. It is unlikely that anyone would experience greater impacts from regional emissions than currently occur. The federal transportation conformity regulation provides a means of ensuring growth in emissions does not exceed emission budgets for each County. Regional Transportation Plans and Regional Transportation Improvement Plans must provide a conformity analysis based on the latest planning assumptions that demonstrates that budgets will not be exceeded. If budgets are exceeded, the San Joaquin Valley may be subject to Clean Air Act sanctions until the deficiency is addressed.

Particulate emission impacts can be localized and regional. Particulates can be directly emitted and can be formed in the atmosphere with chemical reactions. Small directly emitted particles such as diesel emissions and other combustion emissions can remain in the atmosphere for a long time and can be transported over long distances. Large particles such as fugitive dust tend to be deposited a short distance from where emitted but can also travel long distances during periods of high winds. Particulates can be washed out of the atmosphere by rain and deposited on surfaces. Secondary particulates formed in the atmosphere such as ammonium nitrate require NO<sub>x</sub> and ammonia and require low inversion levels, and certain ranges of temperature and humidity to result in substantial concentrations. These complications, make modeling project particulate emissions to determine concentration only feasible for directly emitted particles at receptor locations close to the project site. Regional particulate concentrations are modeled using a gridded inventory (emissions in tons/day are placed a four-kilometer three-dimensional grid to spatially allocate the emissions geographically) and an atmospheric chemistry component to simulate the chemical reactions. The model uses relative reduction factors to determine the amount of reductions of each PM component will be needed to attain the air quality standards on the days with the conditions most favorable to high particulate concentrations. A small project would not produce sufficient emissions to determine a project's individual contribution to the particulate concentration and health impact.

Since the Basin is nonattainment for ozone, PM<sub>10</sub>, and PM<sub>2.5</sub>, it is considered to have an existing significant cumulative health impact without the project. When this occurs, the analysis considers whether the project's contribution to the existing violation of air quality standards is cumulatively considerable. The SJVAPCD regional thresholds for NO<sub>x</sub>, VOC, PM<sub>10</sub>, or PM<sub>2.5</sub> are applied as cumulative contribution thresholds. Projects that exceed the regional thresholds would have a cumulatively considerable health impact. As shown in Table 4.B and Table 4.B, the construction and

operational emissions analysis indicates that the project would not exceed SJVAPCD significance thresholds.

In addition, the SJVAPCD Air Quality Attainment Plans predict that nonattainment pollutant emissions will continue to decline each year as regulations adopted to reduce these emissions are implemented, accounting for growth projected for the region. Therefore, the cumulative health impact will also decline even with the project's emission contribution. As such, impacts would be considered less than significant.

*c. Would the project expose sensitive receptors to substantial pollutant concentrations?*

Sensitive receptors are defined as people that have an increased sensitivity to air pollution or environmental contaminants, including children, the elderly, and persons with pre-existing respiratory or cardiovascular illness. The SJVAPCD considers a sensitive receptor a location that houses or attracts children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Examples of sensitive receptors include hospitals, residences, convalescent facilities, and schools. The proposed project includes residences, assisted living, and a skilled nursing facility that would house sensitive receptors.

**Off-Site Sensitive Receptors.** Construction activities associated with the proposed project may expose surrounding sensitive receptors to airborne particulates, as well as a small quantity of construction equipment pollutants (i.e., usually diesel-fueled vehicles and equipment). However, construction contractors would be required to implement measures to reduce or eliminate emissions by following the Regulation VIII, Fugitive PM<sub>10</sub> Prohibitions. Project construction emissions would be below SJVAPCD significance thresholds. In addition, once the proposed project is constructed, the project would not be a significant source of long-term operational emissions. Therefore, the proposed project would not expose sensitive receptors to substantial pollutant concentrations, and potential impacts to off-site sensitive receptors would be considered less than significant.

**On-Site Sensitive Receptors.** The proposed project would not be a significant source of TAC emissions. Construction activities produce short term emissions that would not contribute substantially to cancer risk, which is estimated based on a 70-year exposure period. In the California Building Industry Association v. Bay Area Air Quality Management District (BAAQMD), 62 Cal.4th 369 (2015) (Case No. S213478) the California Supreme Court held that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents." Although the Court ruled that impacts from the existing environment on projects are not required to be addressed under CEQA, land uses such as gasoline stations, dry cleaners, distribution centers, and auto body shops can expose residents or other sensitive receptors to high levels of TAC emissions if they are in proximity of the project site. Information regarding the location of existing TAC sources is provided for disclosure purposes only and not as a measure of the project's significance under CEQA. Consistency with these recommendations is assessed as follows:

- Heavily traveled roads. The California Air Resource Board (CARB) recommends avoiding new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or

rural roads with 50,000 vehicles per day. Epidemiological studies indicate that the distance from the roadway and truck traffic densities were key factors in the correlation of health effects, particularly in children. The project is located north of SR-198. The traffic volume on SR-198 was 35,500 trips per day in 2017. Therefore, no roads serving the project would exceed this criterion.

- Distribution centers. CARB also recommends avoiding siting new sensitive land uses within 1,000 feet of a distribution center. The project is not located within 1,000 feet of a distribution center.
- Fueling stations. CARB recommends avoiding new sensitive land uses within 300 feet of a large fueling station (a facility with a throughput of 3.6 million gallons per year or greater). CARB recommends a 50-foot separation from typical gas dispensing facilities. The nearest gas station is approximately 0.18 mile southeast of the project site at the corner of 11th Avenue and West 3rd Street.
- Dry cleaning operations. CARB recommends avoiding siting new sensitive land uses within 300 feet of any dry-cleaning operation that uses perchloroethylene. For operations with two or more machines, CARB recommends a buffer of 500 feet. For operations with three or more machines, CARB recommends consultation with the local air district. The nearest dry-cleaning operation is approximately 0.76 mile east of the project site at 119 N. Douty Street.
- Auto body shops. Auto body shops have the potential to emit TACs related to painting. The nearest auto body shop is approximately 0.47 mile east of the project site at 329 W. 5th Street, which is beyond the distance that would result in a measurable impact.

As such, impacts to future on-site sensitive receptors would be less than significant.

**Localized Pollutant Analysis.** Emissions occurring at or near the project have the potential to create a localized impact, also referred to as an air pollutant hotspot. Localized emissions are considered significant if, when combined with background emissions, they would result in exceedance of any health-based air quality standard. The impact from localized pollutants is based on the impact to the nearest sensitive receptor.

The SJVAPCD's GAMAQI includes screening thresholds for identifying projects that need detailed analysis for localized impacts. Projects with on-site emission increases from construction activities or operational activities that exceed the 100 pounds per day screening level of any criteria pollutant after compliance with Rule 9510 and implementation of all enforceable mitigation measures would require preparation of an ambient air quality analysis. The criteria pollutants of concern for localized impact in the SJVAB are PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>x</sub>, and CO. There is no localized emission standard for ROG and most types of ROG are not toxic and have no health-based standard; however, ROG was included for informational purposes only.

The results of the construction screening analysis are presented in Table 4.D.



**Table 4.D: Maximum Daily Air Pollutant Emissions during Construction**

| Year                                          | Emissions (pounds per day) |                 |             |                  |                   |
|-----------------------------------------------|----------------------------|-----------------|-------------|------------------|-------------------|
|                                               | ROG                        | NO <sub>x</sub> | CO          | PM <sub>10</sub> | PM <sub>2.5</sub> |
| <b>Highest Emissions in Any Year</b>          | <b>53.6</b>                | <b>59.4</b>     | <b>38.8</b> | <b>8.9</b>       | <b>4.0</b>        |
| Screening Thresholds                          | 100.00                     | 100.00          | 100.00      | 100.00           | 100.00            |
| <b>Exceed Threshold – Significant Impact?</b> | <b>No</b>                  | <b>No</b>       | <b>No</b>   | <b>No</b>        | <b>No</b>         |

Source: LSA (March 2023).

In addition, an analysis of maximum daily emissions during operation was conducted to determine if emissions would exceed 100 pounds per day for any pollutant of concern. Operational emissions include emissions generated on-site by area sources such as natural gas combustion and landscape maintenance, and off-site by motor vehicles accessing the project. By design, the localized impacts analysis only includes on-site sources; however, the CalEEMod outputs do not separate on-site and off-site emissions for mobile sources. Most motor vehicle emissions would occur distant from the site and would not contribute to a violation of ambient air quality standards; therefore, operational emissions only reflect the emissions within one half mile of the project site. As such, considering the total trip length included in CalEEMod, this analysis conservatively assumes that 5 percent of the project-related mobile source would occur on site. The results of the screening analysis are presented in Table 4.E.

**Table 4.E: Maximum Daily Air Pollutant Emissions during Operations**

| Source                   | Emissions (pounds per day) |                 |             |                  |                   |
|--------------------------|----------------------------|-----------------|-------------|------------------|-------------------|
|                          | ROG                        | NO <sub>x</sub> | CO          | PM <sub>10</sub> | PM <sub>2.5</sub> |
| <b>Total</b>             | <b>20.0</b>                | <b>3.5</b>      | <b>80.6</b> | <b>7.9</b>       | <b>7.3</b>        |
| Screening Threshold      | 100.00                     | 100.00          | 100.00      | 100.00           | 100.00            |
| <b>Exceed Threshold?</b> | <b>No</b>                  | <b>No</b>       | <b>No</b>   | <b>No</b>        | <b>No</b>         |

Source: LSA (March 2023).

As shown in Tables 4.D and 4.E, construction and operation of the proposed project would not exceed SJVAPCD screening thresholds for localized pollutant impacts; therefore, the project's localized criteria impacts would be less than significant.

**Carbon Monoxide Hot Spot Analysis.** Localized high levels of CO are associated with traffic congestion and idling or slow-moving vehicles. The SJVAPCD provides screening criteria to determine when to quantify local CO concentrations based on impacts to the level of service (LOS) of intersections in the project vicinity.

The construction of the project would result in minor increases in traffic for the surrounding road network during the duration of construction. Once operational, motor vehicles accessing the site would result in approximately 742 peak hourly trips and 7,493 average daily trips and would not substantially reduce the LOS with expected roadway improvements. As discussed in Section 4.17, Transportation, the 12th Avenue at Glendale Avenue intersection currently exceeds the City of Hanford's minimum LOS criteria during the PM peak hour. In addition, results of the analysis show

that the proposed project contributes to an unacceptable LOS at five of the study intersections when comparing the Cumulative Year 2042 scenarios. Section 4.17, Transportation, identifies potential intersection improvements; however, the intersection of 12th Avenue at Glendale Avenue would be above the City's standard of LOS D standard. The City acknowledges in General Plan Objective CI 2 and Policy CI 2.2, that there may be instances where design considerations or other public health, safety, or welfare factors determine otherwise. Therefore, since additional improvements are not recommended due design considerations, impacts to intersection LOS are considered to be less than significant. Therefore, the project would not significantly contribute to an exceedance of state or federal CO standards.

**Valley Fever.** Valley fever, or coccidioidomycosis, is an infection caused by inhalation of the spores of the fungus, *Coccidioides immitis* (*C. immitis*). The spores live in soil and can live for an extended time in harsh environmental conditions. Activities or conditions that increase the amount of fugitive dust contribute to greater exposure, and they include dust storms, grading, and recreational off-road activities.

The San Joaquin Valley is considered an endemic area for Valley fever. However, within endemic areas less favorable for the occurrence of *C. immitis* include: cultivated fields; heavily vegetated areas (e.g. grassy lawns); higher elevations (above 7,000 feet); areas where commercial fertilizers (e.g. ammonium sulfate) have been applied; areas that are continually wet; paved (asphalt or concrete) or oiled areas; soils containing abundant microorganisms; and heavily urbanized areas where there is little undisturbed virgin soil.<sup>6</sup>

The project site is situated in an infill area. The project includes urbanization of a site that was formerly graded. Therefore, implementation of the project would have a low probability of the site having *C. immitis* growth sites and exposure to the spores from disturbed soil.

Construction activities would generate fugitive dust that could contain *C. immitis* spores. The proposed project would minimize the generation of fugitive dust during construction activities by complying with SJVAPCD Regulation VIII. Therefore, this regulation, combined with the relatively low probability of the presence of *C. immitis* spores, would reduce Valley fever impacts to less than significant. During operations, dust emissions are anticipated to be negligible, because most of the project area would be occupied by buildings, pavement, and landscaped areas. This condition would preclude the possibility of the project from providing habitat suitable for *C. immitis* spores and for generating fugitive dust that may contribute to Valley fever exposure. Impacts would be less than significant.

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<sup>6</sup> U. S. Geological Survey. 2000. Operational Guidelines (version 1.0) for Geological Fieldwork in Areas Endemic for Coccidioidomycosis (Valley Fever). Website: [pubs.er.usgs.gov/publication/ofr00348](https://pubs.er.usgs.gov/publication/ofr00348) (accessed March 2023).

**Naturally Occurring Asbestos.** According to a map of areas where naturally occurring asbestos in California are likely to occur,<sup>7</sup> there are no such areas in the project area. Therefore, development of the project is not anticipated to expose receptors to naturally occurring asbestos. Impacts would be less than significant.

*d. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

Land uses that are typically identified as sources of objectionable odors include landfills, transfer stations, sewage treatment plants, wastewater pump stations, composting facilities, feed lots, coffee roasters, asphalt batch plants, and rendering plants. The project would not engage in any of these activities. Therefore, the project would not be considered a generator of objectionable odors during operations.

During construction, the various diesel-powered vehicles and equipment in use on-site would create localized odors. These odors would be temporary and would not likely be noticeable for extended periods of time beyond the project's site boundaries. The potential for diesel odor impacts would therefore be less than significant.

As a residential and medical office development, the project has the potential to place sensitive receptors near existing odor sources. The City's wastewater treatment plant is located approximately 1.75 miles south southeast of the project site. The prevailing wind direction in Hanford is northwesterly; therefore, the site location would not be exposed to substantial odors. There are no other major odor-generating sources near the project site. Therefore, the proposed project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people, and potential impacts would be considered less than significant.

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<sup>7</sup> U.S. Geological Survey. 2011. Van Gosen, B.S., and Clinkenbeard, J.P. California Geological Survey Map Sheet 59. Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California. Open-File Report 2011-1188. Website: <http://pubs.usgs.gov/of/2011/1188/> (accessed March 2023).



## 4.4 BIOLOGICAL RESOURCES

|                                                                                                                                                                                                                                                                                                                      | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|-------------------------------------|
| Would the project:                                                                                                                                                                                                                                                                                                   |                                      |                                                             |                                     |                                     |
| a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?                                                               | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?                                                                                         | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/>            |
| d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?                                                                                   | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?                                                                                                                                                                                  | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/>            |
| f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?                                                                                                                                 | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

The following discussion is based on the findings of the Biological Resources Assessment<sup>8</sup> prepared for the proposed project. The Biological Resources Assessment is included as Appendix B.

**Methods.** LSA Biologist Kelly McDonald conducted a literature review and records search on March 31, 2020, to identify the existence and potential for occurrence of sensitive or special status<sup>9</sup> plant and animal species in the vicinity of the project site. Federal and State lists of sensitive species were also examined. Current electronic database records reviewed included the following:

<sup>8</sup> LSA. 2020. *Biological Resources Assessments Hanford Place Project Kings County, California*. May.

<sup>9</sup> For the purposed of this report, the term “special-status species” refers to those species that are listed or proposed for listing under the CESA and/or FESA, California Fully Protected Species, California Species of Special Concern, and California Special Animals. It should be noted that “Species of Special Concern” and “California Special Animal” are administrative designations made by the CDFW and carry no formal legal protection status. However, Section 15380 of the *State CEQA Guidelines* indicates that these species should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein.

- **California Natural Diversity Data Base information (CNDDB – RareFind 5)**, which is administered by the California Department of Fish and Wildlife (CDFW), formerly known as the California Department of Fish and Game (CDFG). This database covers sensitive plant and animal species as well as sensitive natural communities that occur in California. Records from nine USGS quadrangles surrounding the project site (*Riverdale, Laton, Burris Park, Lemoore, Hanford, Remnøy, Stratford, Guernsey, and Waukena*) were obtained from this database to inform the field survey.
- **California Native Plant Society’s (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants**, which utilizes four specific categories or “lists” of sensitive plant species to assist with the conservation of rare or endangered botanical resources. All of the plants constituting California Rare Plant Ranks (CRPR) 1A, 1B, 2A, and 2B are intended to meet the status definitions of “threatened” or “endangered” in CESA and the California Department of Fish and Game Code, and are considered by CNPS to be eligible for State listing. At the discretion of the CEQA Lead Agency, impacts to these species may be analyzed as such, pursuant to the *State CEQA Guidelines* Sections 15125(c) and 15380. Plants in Rank 3 (limited information; review list), Rank 4 (limited distribution; watch list), or that are considered Locally Unusual and Significant may be analyzed under CEQA if there is sufficient information to assess potential significant impacts. Records from the nine USGS quadrangles surrounding the project site were obtained from this database to inform the field survey.
- **United States Fish and Wildlife Service’s (USFWS) Information for Planning and Conservation (IPaC) Online System**, which lists all proposed, candidate, threatened, and endangered species managed by the Endangered Species Program of the USFWS that have the potential to occur on or near a particular site. This database also lists all known critical habitats, national wildlife refuges, and migratory birds that could potentially be impacted by activities from a proposed project. An IPaC Trust Resource Report was generated for the project area.
- **Designated and Proposed USFWS Critical Habitat Polygons** were reviewed to determine whether critical habitat has been designated or proposed within or in the vicinity of the project site.
- **The USFWS National Wetlands Inventory** was reviewed to determine whether any wetlands or surface waters of the United States have been previously-identified in the survey area.
- **eBird**: eBird is a real-time, online checklist program launched in 2002 by the Cornell Lab of Ornithology and National Audubon Society. It provides rich data sources for basic information on bird abundance and distribution at a variety of spatial and temporal scales. eBird occurrence records for burrowing owl (*Athene cunicularia*) from a 5-mile radius around the project site were reviewed in May 2020.

In addition to the databases listed above, historic and current aerial imagery, existing environmental reports for developments in the project vicinity, and local land use policies related to biological resources were reviewed.

A general biological survey of the project site was conducted by LSA Biologist Kelly McDonald on April 27, 2020. The project site was surveyed on foot, and all biological resources observed were noted and mapped. Suitable habitat for any species of interest or concern was duly noted, and general site conditions were photographed. The field survey took place on a clear sunny morning with weather conditions conducive to the detection of plant and animal species.

- a. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

The Hanford region supports various special-status natural communities, plants, and animals. The Biological Resources Assessment provides tables that identify those special-status plant and animal species known to occur or that potentially occur in the vicinity of the project site (based on the literature review and experience in the region) and includes detailed information about each species' habitat and distribution, State and federal status designations, and probability of occurrence within the project site. As stated in the methodology section above, the background research included occurrence records from nine United States Geological Survey (USGS) topographic quadrangles surrounding the survey area. A nine USGS quadrangle search covers a large, variable geographic and topographic area containing numerous habitat types not found within or around the project site.

**Special-Status Natural Communities.** No special-status natural communities or conservation areas exist within the project site or in adjacent parcels. The project site is completely isolated and distant from all special-status natural communities that occur in the region. Therefore, as the project site does not contain any special-status natural communities, such habitats would not be impacted by the proposed project.

**Special-Status Species.** No special-status plant species are expected to occur within the project site or to be adversely affected by the proposed project.

While no special-status animal species (or signs of such species) were observed on site during the April 2020 survey, several small mammal burrows were observed within the project site that are considered suitable habitat for burrowing owl, a California Species of Special Concern, and/or San Joaquin kit fox, a federally listed as endangered and state-listed as threatened species. None of the small mammal burrows observed in the project site exhibited features typical of occupied kit fox or burrowing owl burrows at the time of the survey, although there is some potential for use by these species in the future. Potentially significant direct and indirect impacts, including mortality, harassment, or other forms of incidental take, could occur if construction-related ground disturbance occurs in or around an occupied den or burrow.

No other special-status species were determined to have a moderate or high probability of occurrence on the project site (refer to Appendix D of the Biological Resources Assessment). The removal of the disturbed annual grassland habitat documented on the project site is not anticipated to substantially impact the population sizes of any special-status animal species given the context and setting of the project site and additional habitats for such species in the project vicinity.



While suitable habitat for shrub and tree nesting birds is very limited on the project site (only one tree occurs within the site boundaries), the project site does contain suitable nesting habitat for a variety of ground-nesting birds and for other birds that could nest in the annual herbaceous vegetation. Nesting birds are protected under the California Fish and Game Code. Construction activities that occur during the nesting bird season (typically February 15 through September 15) have potential to result in the direct or indirect take of nesting birds.

If unmitigated or unavoided, these potential direct and indirect impacts on special-status wildlife species and nesting birds could be considered potentially significant. However, conducting pre-construction surveys and complying with applicable regulatory requirements would prevent or compensate for impacts on special-status species. Therefore, implementation of Mitigation Measures BIO-1 through BIO-4, as summarized below, which would require pre-construction surveys and compliance with applicable regulatory requirements, would effectively mitigate any impacts on special-status wildlife species to less-than-significant levels.

**Mitigation Measure BIO-1****Conduct Preconstruction Clearance Surveys for San Joaquin Kit Fox and Burrowing Owl.**

A preconstruction clearance survey is required for San Joaquin kit fox and burrowing owl no more than 30 calendar days prior to initiation of project activities. All survey results must be delivered to the United States Fish and Wildlife Service's (USFWS), the California Department of Fish and Wildlife (CDFW), and the City. If the survey results find an active burrow of one or both of these species on the project site, the applicant must coordinate with the applicable resource agencies (CDFW for burrowing owl, CDFW and USFWS for kit fox) to obtain applicable agency approval(s)/permit(s) prior to any ground disturbance activities on the site.

Specific avoidance, den excavation, passive relocation, and compensatory mitigation activities shall be performed as required by the applicable agency. Appropriate provisions of the *CDFW Staff Report on Burrowing Owl Mitigation* and *USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* shall be adhered to.

**Mitigation Measure BIO-2**

**Worker Environmental Awareness Training.** Prior to initial groundbreaking, Worker Environmental Awareness Training shall be conducted by a qualified biologist to educate all construction personnel on the relevant federal, state, and local laws related to potentially occurring special-status species at the site. The tailgate session shall include training on identification of species that may be found on the project site, the status of those species, and any legal protection afforded to those species. Personnel will be advised to report any special-status species encountered promptly. A fact sheet conveying this information will be prepared for display or for distribution to anyone who may enter the project site.

### Mitigation Measure BIO-3

#### Construction Site Housekeeping and Operational Requirements.

Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities shall be minimized by adhering to the following *USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox*:

- a. To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas shall also be included in preconstruction surveys and, to the extent possible, shall be established in locations disturbed by previous activities to prevent further impacts.
- b. Project-related vehicles shall observe a daytime speed limit of 20-mph throughout the site in all project sites, except on county roads and state and federal highways; this is particularly important at night when kit foxes are most active. Night-time construction shall be minimized to the extent possible. However, if it does occur, then the speed limit shall be reduced to 10-mph. Off-road traffic outside of designated project sites shall be prohibited.
- c. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2-feet deep shall be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the USFWS and the CDFW shall be contacted.
- d. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW have been consulted. If necessary, and under the direct supervision of a qualified biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped. In the case of

trapped animals, escape ramps or structures shall be installed immediately to allow the animal(s) to escape, or the USFWS and CDFW should be contacted for further guidance.

- e. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from a construction or project site.
- f. Pets, such as dogs or cats, shall not be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.
- g. Use of rodenticides and herbicides in project sites shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

#### Mitigation Measure BIO-4

**Nesting Bird Surveys and Avoidance.** If vegetation removal, construction, or grading activities are planned to occur within the active nesting bird season (February 15 through September 15), a qualified biologist shall conduct a preconstruction nesting bird survey no more than 5 days prior to the start of such activities. The nesting bird survey shall include the project site and areas immediately adjacent to the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust, etc. For any active nest(s) identified, the qualified biologist shall establish an appropriate buffer zone around the active nest(s). The appropriate buffer shall be determined by the qualified biologist based on species, location, and the nature of the proposed activities. Project activities shall be avoided within the buffer zone until the nest is deemed no longer active by the qualified biologist.

**Critical Habitat.** The project would not result in any impacts to critical habitat, and no additional mitigation is required.



- b. *Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

No riparian habitat or other sensitive natural communities are present at the project site. Therefore, implementation of the proposed project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community. As a result, no impact would occur.

- c. *Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

The project proposes to convert an open trapezoidal segment of Peoples Ditch (an excavated irrigation canal) to a 66-inch-diameter below-ground pipe culvert which would terminate approximately 20 feet short of the existing pipe culvert that runs under SR-198. Approximately 0.50 acre of the irrigation canal would be undergrounded as part of the project.

Peoples Ditch does not meet the definition of a jurisdictional water of the United States pursuant to the *Navigable Waters Protection Rule*, effective June 22, 2020. Furthermore, Peoples Ditch does not meet the wetland criteria outlined in the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*, which excludes agricultural ditches with ephemeral flow that are not a relocated water of the state or excavated in a water of the state. Nevertheless, Peoples Ditch may fall within the jurisdiction of CDFW under Section 1602 of the California Fish and Game Code and the Regional Water Quality Control Board (RWQCB) under the California Water Code (e.g., the Porter-Cologne Water Quality Control Act). Furthermore, given the recent substantial changes in operable definitions that have occurred and may continue to occur, and considering the regulatory revisions and potential court actions, it is not possible to definitively predict the regulations that will be in place at the time of a particular jurisdictional determination or permit action by the USACE. Under currently effective Clean Water Act regulations and guidance, the USACE reserves the right to regulate certain resources on a case-by-case basis. Therefore, Mitigation Measure BIO-5 would be required.

**Mitigation Measure BIO-5**

**Agency Coordination for Peoples Ditch.** Prior to any modifications to Peoples Ditch, it is recommended to consult with the United States Army Corps of Engineers (USACE), CDFW, and Regional Water Quality Control Board (RWQCB) to verify the feature's jurisdictional status and obtain applicable permit(s) and/or authorization(s). A notification of streambed alteration should be submitted to the CDFW in accordance with Section 1602 of the California Fish and Game Code. Unless categorically excluded under effective definitions or existing documentation confirms that no permit is needed, the Central Valley RWQCB and Sacramento District of the USACE should be consulted regarding potential permitting needs under the California Water Code and federal Clean Water Act, respectively, associated with the proposed Peoples Ditch modifications.

Implementing applicable permit measures would prevent or compensate for impacts on jurisdictional aquatic resources. Considering the status of Peoples Ditch as a constructed and maintained irrigation canal and the lack of natural drainages, riparian areas, and wetlands on the project site, the project would not result in a substantial adverse effect on State or federally protected wetlands through direct removal, filling, hydrological interruption, or by other means. The impact would be considered less than significant with mitigation incorporated.

*d. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

The wildlife species that occur in the project vicinity are adapted to the urban-wildland interface, and the project would not introduce new affects to the area. The noise, vibration, light, dust, or human disturbance within construction areas would only temporarily deter wildlife from using areas in the immediate vicinity of construction activities. These indirect effects could temporarily alter migration behaviors, territories, or foraging habitats in select areas. However, because these are temporary effects, it is likely that wildlife already living and moving in close proximity to urban development would alter their normal functions for the duration of the project construction and then re-establish these functions once all temporary construction effects have been removed. The proposed project would not place any permanent barriers within any known wildlife movement corridors or interfere with habitat connectivity. The impact would be considered less than significant, and no additional mitigation is required.

*e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

The City of Hanford and Kings County currently do not have a regional Natural Community Conservation Plan or Habitat Conservation Plan. The 2035 General Plan for the City outlines local relevant policies related to biological resources. Below is the list of applicable policies and consistency analysis:

- **5.5.1 Natural Habitat: Goal 04:** Protection of natural habitat and other biological resources.

- *Policy 031 Provision of Open Space Areas: Preserve and enhance open space area.*

Consistency Analysis: The project site is currently designated as a Highway Commercial land use and is isolated from open space areas; therefore, the project is considered consistent with this policy.

- *Policy 032 Wetland and Riparian Corridor: Where appropriate and feasible, establish permanent mechanisms to protect wetlands and riparian corridors.*

Consistency Analysis: The project is not located within wetlands or riparian corridors; therefore, the project is considered consistent with this policy.

- *Policy 033 Vernal Pools:* Identify and protect vernal pools that be located in Planning Area.

Consistency Analysis: Vernal pools are not located within the project site; therefore, the project is considered consistent with this policy.

- *Policy 035 Impacts from Development:* Ensure that potential impacts to biological resources and sensitive habitat are carefully evaluated when considering development projects.

Consistency Analysis: No sensitive or special-status natural communities occur on the project site. An appropriately timed field survey and biological resources assessment were conducted on the project site to determine the likelihood and suitability of sensitive habitat and species; the project is not likely to result in significant impacts on sensitive resources with the implementation of recommended measures. Therefore, the project is considered consistent with this policy.

- *Policy 037 Mature Trees:* Promote the preservation of existing mature trees and encourage the planting of appropriate shade trees in new developments.

Consistency Analysis: The development plan includes the removal of one nonnative tree. The project will include the planting of trees as part of the landscaping plan, resulting in an overall increase in shade trees within the project area. Therefore, the project is considered consistent with this policy.

- *Policy 038 Native Tree Species and Drought Tolerant Vegetation:* Encourage the planting of native tree species and drought-tolerant vegetation.

Consistency Analysis: The landscaping plan will be provided in accordance with Section 17.52 Landscape Standards of the Hanford Municipal Code; all species of trees shall be selected from a list approved by the City's Parks Division. Therefore, the project is considered consistent with this policy.

- **5.5.2 Wildlife and Sensitive Species**

- *Policy 039 Endangered Wildlife and Habitat:* Establish programs in connection with environmental review processes to protect endangered wildlife and their habitats.

Consistency Analysis: An appropriately-timed field survey and literature reviews were conducted for the project in support of the CEQA review process. Based on the analysis and with implementation of the recommended mitigation measures contained herein, it is unlikely that any endangered species would be adversely affected by the project. Therefore, the project is considered consistent with this policy.

- *Policy 040 Sensitive Wildlife:* Work with State, federal, and local agencies on the preservation of sensitive wildlife species in the City.



Consistency Analysis: Implementation of recommended Mitigation Measures BIO-1 through BIO-4, as described above, would ensure consistency with applicable resource agency policies with regard to sensitive wildlife species determined to have potential of occurring on the project site. Therefore, the project is considered consistent with this policy.

With implementation of the Mitigation Measures BIO-1 through BIO-5 listed above, the proposed project would not conflict with any regional habitat conservation plan or local policies related to the protection and conservation of biological resources. Therefore, this impact is considered less than significant with mitigation incorporated.

*f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

The project site is not within the boundaries of a habitat conservation plan or natural community conservation plan. This condition precludes the possibility that implementation of the proposed project would conflict with the provisions of such a plan, and no impact would occur.

## 4.5 CULTURAL RESOURCES

|                                                                                                               | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact | No<br>Impact             |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|------------------------------------|--------------------------|
| Would the project:                                                                                            |                                      |                                                             |                                    |                          |
| a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?      | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |
| b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |
| c. Disturb any human remains, including those interred outside of formal cemeteries?                          | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |

A Cultural Resource Inventory<sup>10</sup> was prepared for the proposed project, which included: (1) a records search at the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) to identify prior cultural resource studies and previously recorded cultural resources in the project area and surrounding 0.5-mile area; (2) desktop archival research to better understand land use and property ownership within the project area; (3) a search of the Native American Heritage Commission's (NAHC) Sacred Lands File and outreach with local tribal representatives; (4) a pedestrian survey of the project area to identify potential historical resources within the project area and preliminary recordation of identified resources on the appropriate California Department of Parks and Recreation record form(s); (5) a buried site sensitivity assessment; and (6) recommendations for further work to assess whether the proposed project would cause adverse impacts to historical resources—i.e., cultural resources eligible for listing on the California Register. The analysis in this Cultural Resources section is based on the results of the Cultural Resource Inventory. The Cultural Resource Inventory is included as Appendix C.

*a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?*

**Records Search Results.** A records search of the project site and a 0.5-mile radius was conducted on May 5, 2020, by staff at the SSJVIC. The SSJVIC reported nine previous cultural studies encompassing portions of the project area that occurred between 1982 and 2015, and five additional studies in the surrounding 0.5-mile area. Of the nine studies within the project area, seven had negative results. The Peoples Ditch is the only previously recorded resource within the project area. In addition, the Southern Pacific Railroad/San Joaquin Valley Railroad is just outside the project area's northern boundary. Two additional built environment resources were identified within a 0.5-mile radius of the project area and one additional resource is also within 0.5 mile of the project area.

**Buried Site Sensitivity Assessment.** Geologic and soil data derived from the National Resources Conservation Service Web Soil Survey identify only one soil type within the project area, consisting of Nord coarse to fine sandy loam. Based on this soil type, the entire project area is encompassed by

<sup>10</sup> Applied EarthWorks, Inc. 2020. *Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project in the City of Hanford, Kings County, California*. August.

a soil type and landform that have high or very high potential for containing anthropogenic paleosols with intact cultural deposits. Adding to this sensitivity is the presence of Dry Creek within the project area during prehistory, which would have provided rich habitat and other resources for Native American groups. Dry Creek was a naturally occurring intermittent stream that was modified during Hanford's early settlement period. However, it is likely that portions of the project area have been disturbed by past infill of Dry Creek and the construction of Peoples Ditch in addition to impacts related to historic-era agricultural and domestic activities in the eastern portion of the project area. In these areas of disturbance, the sensitivity for intact and well-preserved buried sites is moderate, low, or none.

This evidence of modern disturbance notwithstanding, due to the very high sensitivity of the soil type in the project area, and because over excavation and recompact of soil is recommended to mitigate the effects of potential hydrocompaction to at least 7 feet below the existing grade and to a distance of at least 10 feet beyond the perimeter of the planned buildings and surrounding improvements, limited subsurface archaeological testing to confirm the presence/absence of anthropogenic paleosols or intact cultural resource deposits is recommended. Based on the findings of subsurface archaeological testing, archaeological data recovery to assess prehistoric cultural deposits and cultural resource monitoring during ground disturbing construction activities may be needed. As such, implementation of Mitigation Measure CULT-1 would be required.

**Field Survey Results.** During the field survey, one historic-era refuse scatter (AE-4167-01) and one historic-era isolate (AE-4167-ISO-01) were observed. The artifacts date to the first half of the twentieth century, suggesting the deposit may be associated with the nonextant historical structure. In addition, the project site appears to have been impacted by previous agricultural activity that would have displaced artifacts within a few feet of their original placement. The condition of the subsurface deposit is unknown as it was not visible during the pedestrian survey. No prehistoric artifact concentrations, isolated artifacts, features, or evidence of human skeletal material were observed during the survey.

**Built Environment Resources Results.** A modern segment of Peoples Ditch and the remnants of its older, now abandoned, route were observed during survey. As such, the existing California Department of Parks and Recreation cultural resource record for the Peoples Ditch was updated to record its remnant historical alignment within the project area. The new segment is less than 50 years old. The only remaining evidence of the original alignment of the ditch is its scar on the landscape and the remains of a concrete containment well at the northern end of the abandoned segment.

**Summary.** To determine whether the proposed project would cause a substantial adverse change in the significant quantities of a historical resource, additional mapping and subsurface testing would be required. Conducting additional mapping and subsurface testing would prevent potential impacts to historic and archaeological resources that could be uncovered during construction activities. Therefore, Mitigation Measures CULT-1 and CULT-2 would be required to reduce the project's potential impacts to previous unidentified historical resources that may be encountered during construction. Implementation of this mitigation measure would reduce potential impacts to less than significant.



**Mitigation Measure CULT-1**

Because of the very high sensitivity of the soil type in the project area, the possibility exists that buried archaeological deposits within the project site. Therefore, archaeological monitoring must be conducted during ground-disturbing construction activities in native soil, including clearing and grubbing. Monitoring should occur on a full-time basis during all excavation activities until the Project Archaeologist, based on the archaeological monitor's observations, is satisfied that there is little likelihood of encountering intact archaeological deposits. The Project Archaeologist may also determine it is appropriate to reduce monitoring to spot-checking or on a part-time basis.

Upon completion of the monitoring and, if necessary, mitigation, the archaeologist should prepare a report to document the methods and results of the monitoring. The final report should be submitted to the SSJVIC.

**Mitigation Measure CULT-2**

Additional mapping and subsurface testing of AE-4167-01 shall be conducted to evaluate its eligibility for inclusion in the California Register of Historical Resources, pursuant to California Public Resources Code (PRC) 5024.1. Additional focused subsurface testing in areas not previously disturbed by historic-era activities must be conducted to confirm presence/absence of high-sensitivity paleosols that may include intact prehistoric cultural deposits. If intact prehistoric cultural deposits are encountered during subsurface presence/absence testing, further investigation must be conducted to determine if the deposit retains integrity and is eligible for inclusion in the California Register of Historical Resources. The methods and findings of the additional studies would be presented as an addendum to the Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project and would include cultural resource management recommendations to guide mitigation of potential adverse effects to any identified historical resources within the project area.

*b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?*

Mitigation Measures CULT-1 and CULT-2, as presented in Response 4.5.a above, would ensure that potential impacts to archaeological resources would be reduced to a less-than-significant level by conducting additional mapping and subsurface testing to prevent potential impacts to historic and archaeological resources that could be uncovered during construction activities. Therefore, the project would not cause a substantial adverse change in the significance of an archaeological resource.

*c. Would the project disturb any humans remains, including those interred outside of formal cemeteries?*

Although no such remains have been identified within the project site, there is a possibility of encountering such remains, either in isolation or with prehistoric archaeological deposits. Such remains could be uncovered during project ground-disturbing activities. The project would have a significant effect on the environment if it would disturb human remains, including those interred outside of formal cemeteries.

Implementation of Mitigation Measure CULT-3 would reduce potential impacts to human remains to a less than significant level by ensuring compliance with California Health and Safety Code Section 7050.5 in the event that any human remains are encountered during project-related ground-disturbing activities.

In addition, on January 10, 2017, the City of Hanford met with the Tachi Yokut Tribe, on a different project in order to establish conditions, which would apply to all projects in the City of Hanford, which required an initial study. In order to address the concerns of the Tachi Yokut Tribe, the City is requiring the implementation of a Burial Treatment Plan as a mitigation measure. Therefore, implementation Mitigation Measure CULT-4 would ensure implementation of a Burial Treatment Plan and would reduce impacts to a less than significant level.

**Mitigation Measure CULT-3** Any human remains encountered during project-related ground-disturbing activities shall be treated in accordance with California Health and Safety Code Section 7050.5. The project sponsor shall inform all contractor(s) performing excavation of the sensitivity of the project site for human remains and include the following directive in the appropriate contract documents:

If human remains are uncovered, all work within 50 feet of the discovery shall be halted and the Kings County Coroner notified immediately. At the same time, the on-site monitoring archaeologist shall assess the situation and consult with agencies as appropriate. Project personnel shall not collect or move any human remains or associated materials. If the human remains are of Native American origin, the Coroner must notify the California State Native American Heritage Commission (NAHC) within 24 hours of this identification. The NAHC will formally identify a Native American Most Likely Descendant (MLD)—if one is not already on-site—to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods. Such recommendations shall be carried out to the satisfaction of the NAHC prior to work resuming within 50 feet of the discovered remains.

**Mitigation Measure CULT-4** A Burial Treatment Plan shall be entered into by the project applicant/property owner prior to any ground disturbing activities.

## 4.6 ENERGY

|                                                                                                                                                                                    | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                                                                                 |                                      |                                                             |                                     |                          |
| a. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?                                                                                      | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

*a. Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?*

The proposed project would increase the demand for electricity, natural gas, and gasoline. The discussion and analysis provided below is based on the CalEEMod output included as Appendix A.

**Construction-Period Energy Use.** The anticipated construction schedule assumes that the proposed project would be built over approximately 3 years. The proposed project would require grading, site preparation, and building activities during construction.

Construction of the proposed project would require energy for the manufacture and transportation of construction materials, preparation of the site for demolition and grading activities, and construction of the residences. Petroleum fuels (e.g., diesel and gasoline) would be the primary sources of energy for these activities. Construction activities are not anticipated to result in an inefficient use of energy as gasoline and diesel fuel would be supplied by construction contractors who would conserve the use of their supplies to minimize their costs on the project. Energy usage on the project site during construction would be temporary in nature and would be relatively small in comparison to the State's available energy sources. Therefore, construction energy impacts would be less than significant.

**Operational Energy Use.** Energy use consumed by the proposed project would be associated with natural gas use, electricity consumption, and fuel used for vehicle trips associated with the project. Energy and natural gas consumption was estimated for the project using default energy intensities by building type in CalEEMod.

CalEEMod divides building electricity and natural gas use into uses that are subject to Title 24 standards and those that are not. For electricity, Title 24 uses include the major building envelope systems covered by Part 6 (California Energy Code) of Title 24 (e.g., space heating, space cooling, water heating, and ventilation). Non-Title 24 uses include all other end uses (e.g., appliances, electronics, and other miscellaneous plug-in uses). Because some lighting is not considered as part of the building envelope energy budget, CalEEMod considers lighting as a separate electricity use category. For natural gas, uses are likewise categorized as Title 24 or Non-Title 24, with Title 24 uses



including building heating and hot water end uses. Non-Title 24 natural gas uses include cooking and appliances (including pool/spa heaters).

Table 4.F, below, shows the estimated potential increased electricity, natural gas, gasoline, and diesel demand associated with the proposed project. The electricity and natural gas rates are from the CalEEMod analysis, while the gasoline and diesel rates are based on the traffic analysis in conjunction with United States Department of Transportation (DOT) fuel efficiency data.

**Table 4.F: Estimated Annual Energy Use of Proposed Project**

| Land Use                                                                                                    | Electricity Use<br>(kWh per year) | Natural Gas<br>Use<br>(therms per<br>year) | Gasoline<br>(gallons per<br>year) | Diesel (gallons<br>per year) |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------|-----------------------------------|------------------------------|
| Ambulatory Surgery Center, Specialty Clinic,<br>Medical Office Building, and Psychiatric<br>Health Facility | 1,395,423                         | 26,572                                     | 67,277                            | 55,850                       |
| Hotel and Conference Center                                                                                 | 1,403,506                         | 30,168                                     | 32,955                            | 27,358                       |
| Nursing College                                                                                             | 365,853                           | 15,649                                     | 30,809                            | 25,576                       |
| Skilled Nursing Facility, Memory Care,<br>Assisted Living Facility                                          | 701,757                           | 24,991                                     | 37,905                            | 31,467                       |
| Multi-Family Apartments                                                                                     | 454,375                           | 16,181                                     | 32,930                            | 27,337                       |
| Medical/Commercial                                                                                          | 427,442                           | 2,508                                      | 62,119                            | 51,569                       |
| Parking Lot                                                                                                 | 596,800                           | 0                                          | 0                                 | 0                            |
| <b>Total</b>                                                                                                | <b>5,345,159</b>                  | <b>116,068</b>                             | <b>263,994</b>                    | <b>219,156</b>               |

Source: LSA (March 2023).

As shown in Table 4.F, the estimated potential increased electricity demand associated with the proposed project is 5,345,159 kilowatt-hours (kWh) per year. In 2021, California consumed approximately 280,738 gigawatt-hours (GWh) or 280,738,376,720 kWh.<sup>11</sup> Of this total, Kings County consumed 1,980 GWh or 1,980,705,673 kWh.<sup>12</sup> Therefore, electricity demand associated with the proposed project would only be approximately 0.27 percent of Kings County's total electricity demand.

The estimated potential increased natural gas demand associated with the proposed project is 116,068 therms per year, as shown in Table 4.F. In 2021, California consumed approximately 11,923 million therms or 11,923,705,642 therms, while Kings County consumed approximately 64 million therms or approximately 64,004,283 therms.<sup>13</sup> Therefore, natural gas demand associated with the proposed project would only be approximately 0.18 percent of Kings County's total natural gas demand.

<sup>11</sup> California Energy Commission. 2022b. Energy Consumption Data Management Service. Electricity Consumption by County and Entity. Website: [www.ecdms.energy.ca.gov/elecbycounty.aspx](http://www.ecdms.energy.ca.gov/elecbycounty.aspx) (accessed March 2023).

<sup>12</sup> Ibid.

<sup>13</sup> California Energy Commission. 2022c. Energy Consumption Data Management Service. Gas Consumption by County and Entity. Website: [www.ecdms.energy.ca.gov/gasbycounty.aspx](http://www.ecdms.energy.ca.gov/gasbycounty.aspx) (accessed March 2023).

In addition, the proposed project would result in energy usage associated with gasoline and diesel to fuel project-related trips. The average fuel economy for light-duty vehicles (autos, pickups, vans, and SUVs) in the United States has steadily increased from about 14.9 miles per gallon (mpg) in 1980 to 22.9 mpg in 2020.<sup>14</sup> The average fuel economy for heavy-duty trucks in the United States has also steadily increased, from 5.7 mpg in 2013 to a projected 8.0 mpg in 2021.<sup>15</sup>

Using the average USEPA gasoline fuel economy estimates for 2020, the California diesel fuel economy estimates for 2021, and the traffic data from the project traffic analysis, the proposed project would result in the annual consumption of approximately 263,994 gallons of gasoline and 219,156 gallons of diesel. In 2019, vehicles in California consumed approximately 15.6 billion gallons of gasoline and 3.8 billion gallons of diesel fuel.<sup>16</sup> Therefore, gasoline and diesel demand generated by vehicle trips associated with the proposed project would be a minimal fraction of gasoline and diesel fuel consumption in California and Kings County.

In addition, vehicles associated with trips to and from the project site would be subject to fuel economy and efficiency standards, which are applicable throughout the State. As such, the fuel efficiency of vehicles associated with project operations would increase throughout the life of the proposed project. Therefore, implementation of the proposed project would not result in a substantial increase in transportation-related energy uses.

The proposed project would be constructed to CALGreen standards, which would help to reduce energy and natural gas consumption. Therefore, the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of fuel or energy and would incorporate renewable energy or energy efficiency measures into building design, equipment use, and transportation. Construction and operation period impacts related to consumption of energy resources would be less than significant.

*b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?*

In 2002, the Legislature passed Senate Bill 1389, which required the California Energy Commission (CEC) to develop an integrated energy plan every two years for electricity, natural gas, and transportation fuels, for the California Energy Policy Report. The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero emission (ZE) vehicles and their

<sup>14</sup> U.S. Department of Transportation (DOT). "Table 4-23: Average Fuel Efficiency of U.S. Light Duty Vehicles." Website: <https://www.bts.gov/content/average-fuel-efficiency-us-light-duty-vehicles> (accessed March 2023).

<sup>15</sup> Ibid.

<sup>16</sup> CEC. n.d. California Gasoline Data, Facts, and Statistics. Website: [www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/california-gasoline-data-facts-and-statistics](http://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/california-gasoline-data-facts-and-statistics) (accessed March 2023).

infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled (VMT) and accommodate pedestrian and bicycle access.

The most recently adopted report includes the 2021 Integrated Energy Policy Report<sup>17</sup> and the 2022 Integrated Energy Policy Report Update.<sup>18</sup> The Integrated Energy Policy Report provides the results of the CEC's assessments of a variety of energy issues facing California. Many of these issues will require action if the State is to meet its climate, energy, air quality, and other environmental goals while maintaining energy reliability and controlling costs. The Integrated Energy Policy Report covers a broad range of topics, including implementation of Senate Bill 350, integrated resource planning, distributed energy resources, transportation electrification, solutions to increase resiliency in the electricity sector, energy efficiency, transportation electrification, barriers faced by disadvantaged communities, demand response, transmission and landscape-scale planning, the California Energy Demand Preliminary Forecast, the preliminary transportation energy demand forecast, renewable gas (in response to Senate Bill 1383), updates on California electricity reliability, natural gas outlook, and climate adaptation and resiliency.

As indicated above, energy usage on the project site during construction would be temporary in nature. In addition, energy usage associated with operation of the proposed project would be relatively small in comparison to the State's available energy sources and energy impacts would be negligible at the regional level. Because California's energy conservation planning actions are conducted at a regional level, and because the project's total impact to regional energy supplies would be minor, the proposed project would not conflict with California's energy conservation plans as described in the CEC's Integrated Energy Policy Report. Thus, as shown above, the project would avoid or reduce the inefficient, wasteful, and unnecessary consumption of energy and not result in any irreversible or irretrievable commitments of energy. Therefore, the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation and this impact would be less than significant.

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<sup>17</sup> CEC. 2021. *2021 Integrated Energy Policy Report*. California Energy Commission. Docket Number: 21-IEPR-01.

<sup>18</sup> CEC. 2022a. *2020 Integrated Energy Policy Report Update*. California Energy Commission. Docket Number: 22-IEPR-01.



## 4.7 GEOLOGY AND SOILS

|                                                                                                                                                                                                                                                                                        | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|-------------------------------------|
| Would the project:                                                                                                                                                                                                                                                                     |                                      |                                                             |                                     |                                     |
| a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:                                                                                                                                                         |                                      |                                                             |                                     |                                     |
| i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| ii. Strong seismic ground shaking?                                                                                                                                                                                                                                                     | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| iii. Seismic-related ground failure, including liquefaction?                                                                                                                                                                                                                           | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| iv. Landslides?                                                                                                                                                                                                                                                                        | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Result in substantial soil erosion or the loss of topsoil?                                                                                                                                                                                                                          | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?                                                     | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?                                                                                                                    | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?                                                                                                   | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?                                                                                                                                                                                | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/>            |

This section is based on the Preliminary Geotechnical Investigation and Geologic and Seismic Hazards Evaluation Report.<sup>19</sup> The Preliminary Geotechnical Investigation and Geologic and Seismic Hazards Evaluation Report is included as Appendix D.

a. *Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:*

i. *Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*

The project site is not located within a currently designated Alquist-Priolo Earthquake Zone. In addition, no known active or potentially active faults or fault traces are located in the project vicinity and no major fault systems are known to exist in Kings County.<sup>20</sup> The project site is

<sup>19</sup> Kleinfelder. 2020. *Preliminary Geotechnical Investigation and Geologic and Seismic Hazards Evaluation Report Proposed Hanford Place, Medical and Mixed-Use Property Hanford, California*. June 9.

<sup>20</sup> Hanford, City of. 2017, op. cit.

located approximately 58 miles east of the San Andreas fault and approximately 42 miles east of the Great Valley fault. A major seismic event on these fault segments may cause significant ground shaking at the site.<sup>21</sup> However, as no known active, or potentially active faults cross or project toward the project site, the potential for fault-related surface rupture at the site is considered very low.<sup>22</sup> In addition, the proposed project would be built to current building codes and standards to reduce the potential for structural failure caused by ground shaking and other geologic hazards. Therefore, no people or structures would be exposed to potential substantial adverse effects, including the risk of loss, injury, or death from the rupture of a known earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, and impacts would be less than significant.

*ii. Strong seismic ground shaking?*

As identified above, no known active or potentially active faults or fault traces are located in the project vicinity and no major fault systems are known to exist in Kings County. Ground shaking is the most likely damaging effect of an earthquake in Hanford. However, as no known active, or potentially active faults cross or project toward the project site, the potential for fault-related surface rupture at the site is considered very low.<sup>23</sup> In addition, the proposed project would be built to current building codes and standards to reduce the potential for structural failure caused by ground shaking and other geologic hazards. Therefore, impacts related to strong seismic ground shaking would be less than significant.

*iii. Seismic-related ground failure, including liquefaction?*

Secondary impacts of earthquakes can include landslides, seiches, liquefaction, and dam failure.<sup>24</sup> Liquefaction describes a condition in which a saturated, cohesionless soil loses shear strength during earthquake shocks. Ground motion from an earthquake may induce cyclic reversals of shearing strains of large amplitude. Lateral and vertical movements of the soil mass, combined with loss of bearing strength, usually result from this phenomenon. Historically, liquefaction of soils has caused severe damage to structures, berms, levees and roads. Liquefaction potential depends on soil type, void ratio, depth to groundwater, duration of shaking and confining pressures over the potentially liquefiable soil mass. Fine, well-sorted, loose sand, shallow groundwater, severe seismic ground motion and particularly long durations of ground shaking are conditions conducive for liquefaction. Soils in Hanford do not have significant liquefaction potential.<sup>25</sup> Hanford is located in a stable geologic formation, so the effects of ground shaking on soil stability should be minimal. As such, the proposed project would not expose people or structures to potential substantial effects associated with seismic-related ground failure, including liquefaction. Therefore, this impact is less than significant.

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<sup>21</sup> Kleinfelder. 2020, op. cit.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> Hanford, City of. 2014. *General Plan Background Report - Hanford, California*. March. Website: [cms6.revize.com/revize/hanfordca/document\\_center/Planning/General%20Plan/2034%20General%20Plan%20Background%20Report.pdf](https://cms6.revize.com/revize/hanfordca/document_center/Planning/General%20Plan/2034%20General%20Plan%20Background%20Report.pdf) (accessed March 2023).

<sup>25</sup> Ibid.

*iv. Landslides?*

As discussed above, secondary impacts of earthquakes can include landslides, seiches, liquefaction, and dam failure. However, Hanford is located in a stable geologic formation, so the effects of ground shaking on soil stability should be minimal. In addition, because the project site is generally level, the proposed project would not expose people or structures to potential substantial adverse effects associated with landslides. Therefore, impacts related to landslides would be less than significant.

*b. Would the project result in substantial soil erosion or the loss of topsoil?*

Soil erosion is a process whereby soil materials are worn away and transported to another area, either by wind or water. Rates of erosion can vary depending on the soil material and structure, placement, and human activity. Soil containing high amounts of silt can be easily eroded, while sandy soils are less susceptible. Excessive soil erosion can eventually damage building foundations and roadways. Erosion is most likely to occur on sloped areas with exposed soil, especially where unnatural slopes are created by cut-and-fill activities. Soil erosion rates can be higher during the construction phase. Typically, the soil erosion potential is reduced once the soil is graded and covered with concrete, structures, or asphalt.

Implementation of the proposed project would include grading activities that could result in short-term soil erosion during the construction period. Exposed soils are considered erodible when subjected to concentrated surface flow or wind. Mitigation Measure GEO-1, described below, would reduce the potential for soil erosion.

**Mitigation Measure GEO-1** To reduce the potential for soil erosion during construction of the proposed project, an Erosion Control Plan shall be prepared for the project in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity, prior to the start of grading.

In addition, soil erosion and loss of topsoil would be minimized through implementation of SJVAPCD Regulation VIII fugitive dust control measures and compliance with the National Pollutant Discharge Elimination System (NPDES) permit requirements. With incorporation of Mitigation Measure GEO-1 and compliance with NPDES permit requirements, construction of the proposed project would not result in substantial soil erosion or loss of topsoil. This impact would be less than significant with mitigation incorporated.

*c. Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?*

See Responses 4.7.a.iii and 4.7.a.iv above. The proposed project would not require a substantial grade change or change in topography. The project would not result in on- or off-site landslides, lateral spreading, subsidence, or liquefaction or collapse. However, some of the alluvial soils in the San Joaquin Valley are subject to hydrocompaction. Hydrocompactive soil has a relatively loose



skeletal structure, which is weakly cemented by soluble salts or a slight clay mineral content. Moisture increase breaks down the inter-particle cementation causing a collapse of the skeletal structure. The significant loss in soil volume can result in settlement of overlying structures. The project geotechnical exploration and associated laboratory testing identified the in-place relative density of the subsurface soil was relatively low and compression characteristics were moderate. Based on laboratory testing, post saturation of four soil obtained from the project site had compression characteristics that were low to moderate, indicating a possibility of collapse potential. However, with implementation of the earthwork and design recommendations included in the Preliminary Geotechnical Investigation and Geologic and Seismic Hazards Evaluation Report, impacts would be less than significant.

*d. Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?*

Expansive soils possess a “shrink-swell” characteristic. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying. Structural damage may occur over a long period of time, usually the result of inadequate soil and foundation engineering, or the placement of structures directly on expansive soils. Based on the borings conducted for the Preliminary Geotechnical Investigation and Geologic and Seismic Hazards Evaluation Report, expansive soils were not encountered. Furthermore, based on review of soil survey, expansive soil was not identified within the project area. Expansive soils are not anticipated within the influence of foundation systems or zone of cyclic moisture changes, and therefore, would not dictate the need for special grading or special footing and concrete slab-on-grade design.<sup>26</sup> Therefore, the project would result in a less than significant impact related to substantial risks to life or property due to expansive soils.

*e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?*

The proposed project would not require the use of septic tanks or other alternative wastewater disposal systems. Therefore, no impact would occur.

*f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

Paleontological resources are the mineralized (fossilized) remains of prehistoric plant and animal life exclusive of human remains or artifacts. Fossil remains such as bones, teeth, shells, and leaves are found in geologic deposits (rock formations) where they were originally buried. Fossil remains are considered to be important as they provide indicators of the earth’s chronology and history. These resources are afforded protection under CEQA and are considered to be limited and nonrenewable, and they provide invaluable scientific and educational data. Due to the sensitive nature of these paleontological resources, they are not mapped.

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<sup>26</sup> Kleinfelder. 2020, op. cit.

Implementation of the proposed project would require ground disturbing construction activities that may inadvertently encounter and damage paleontological resources. Should this occur, project construction at both well sites may result in the destruction of a unique paleontological site, resulting in a potentially significant impact. Mitigation Measure GEO-2 would reduce this impact to less than significant by redirecting ground-disturbing activities, consulting with agencies as appropriate, and making recommendations for the treatment of the discovery in the event that any human remains are encountered during project-related ground-disturbing activities.

The following mitigation measure would reduce the paleontological resource impacts associated with the proposed project to a less-than-significant level.

**Mitigation Measure GEO-2**

The project applicant shall inform its contractor(s) of the sensitivity of the project area for paleontological resources. Should paleontological resources be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. If found to be significant, and project activities cannot avoid the paleontological resources, adverse effects to paleontological resources shall be mitigated. Mitigation may include monitoring, recording the fossil locality, data recovery and analysis, a final report, and accessioning the fossil material and technical report to a paleontological repository. Public educational outreach may also be appropriate. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared and submitted to the City for review, and (if paleontological materials are recovered) a paleontological repository, such as the University of California Museum of Paleontology (UCMP). The City shall verify that the above directive has been included in the appropriate contract documents.

## 4.8 GREENHOUSE GAS EMISSIONS

|                                                                                                                                  | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                               |                                      |                                                             |                                     |                          |
| a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?      | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

*a. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

Greenhouse gas emissions (GHGs) are present in the atmosphere naturally, and are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. However, over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global climate change. The gases that are widely seen as the principal contributors to human-induced global climate change are:

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF<sub>6</sub>)

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and the length of time that the gas remains in the atmosphere ("atmospheric lifetime").

The GWP of each gas is measured relative to CO<sub>2</sub>, the most abundant GHG; the definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO<sub>2</sub> over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO<sub>2</sub> equivalents" (CO<sub>2</sub>e).



This section discusses the proposed project’s potential impacts related to the release of GHG emissions for both construction and project operation. Section 15064.4 of the *State CEQA Guidelines* states that: “A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project.” In performing that analysis, the lead agency has discretion to determine whether to use a model or methodology to quantify GHG emissions, or to rely on a qualitative analysis or performance-based standards. In making a determination as to the significance of potential impacts, the lead agency then considers the extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting, whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project, and the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Neither the City of Hanford, nor the SJVAPCD has developed or adopted numeric GHG significance thresholds. Therefore, this analysis evaluates the GHG emissions based on the project’s consistency with State GHG reduction goals.

**Construction Activities.** Construction activities associated with the proposed project would produce combustion emissions from various sources. During construction, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically use fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Furthermore, CH<sub>4</sub> is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

Total GHG emissions generated during all phases of construction were combined and are presented in Table 4.G. The SJVAPCD does not recommend assessing the significance of construction-related emissions. However, other jurisdictions, such as the South Coast Air Quality Management District (SCAQMD) and the Sacramento Metropolitan Air Quality Management District (SMAQMD), have concluded that construction emissions should be included since they may remain in the atmosphere for years after construction is complete. In order to account for the construction emissions, amortization of the total emissions generated during construction were based on the life of the development (nonresidential— 30 years) and added to the operational emissions.

**Table 4.G: Project Construction GHG Emissions**

| Year                    | Metric Tons of CO <sub>2</sub> e per Year |
|-------------------------|-------------------------------------------|
| 2024                    | 815.0                                     |
| 2025                    | 623.0                                     |
| 2026                    | 525.0                                     |
| 2027                    | 11.0                                      |
| <b>Total</b>            | <b>1,973.0</b>                            |
| Amortized over 30 years | 65.8                                      |

Source: LSA (March 2023).

As shown in Table 4.G, it is estimated that construction of the proposed project would generate approximately 1,973.0 metric tons of CO<sub>2</sub>e. When considered over the 30-year life of the project, the total amortized construction emissions for the proposed project would be 65.8 metric tons of CO<sub>2</sub>e per year.

**Operational Emissions.** Long-term GHG emissions are typically generated from mobile sources (e.g., cars, trucks, and buses), area sources (e.g., maintenance activities and landscaping), indirect emissions from sources associated with energy consumption, waste sources (land filling and waste disposal), and water sources (water supply and conveyance, treatment, and distribution). Mobile-source GHG emissions would include project-generated vehicle trips to and from the project. Area-source emissions would be associated with activities such as landscaping and maintenance on the project site. Energy source emissions would be generated at off-site utility providers as a result of increased electricity demand generated by the project. Waste source emissions generated by the proposed project include energy generated by land filling and other methods of disposal related to transporting and managing project generated waste. In addition, water source emissions associated with the proposed project are generated by water supply and conveyance, water treatment, water distribution, and wastewater treatment.

Emissions estimates for operation of the proposed project were calculated using CalEEMod. Model results are shown in Table 4.H. Trip generation rates for the project were based on the project's trip generation estimates, as identified in Section 4.17, Transportation. However, as discussed in Section 4.17, approximately 41,500 square feet of commercial/office uses is proposed. These uses would generate fewer trips than the 114,000 square feet of commercial/office uses that is analyzed in the proposed project trip generation estimate. The trip generation in CalEEMod was adjusted to reflect 41,500 square feet of commercial/office uses. As such, CalEEMod assumes a total of approximately 5,239 ADT, including 1,393 ADT for the Ambulatory Surgery Center, Specialty Clinic, Medical Office Building, and Psychiatric Health Facility, 682 ADT for the Hotel and Conference Center, 638 ADT for the Nursing College, 662 ADT for the Skilled Nursing Facility, Memory Care, Assisted Living Facility, 576 ADT for the Multi-Family Apartments, and 1,287 ADT for the Medical/Commercial uses based on the project's trip generation and taking into account a 10 percent reduction for internal trips. In addition, this analysis assumes the proposed project would be built to current Title 24 building standards. Where project-specific data were not available, default assumptions from CalEEMod were used to estimate project emissions.

**Table 4.H: Operational GHG Emissions**

| Emissions Category       | Operational Emissions (Metric Tons per Year) |                 |                  |                   |                  |
|--------------------------|----------------------------------------------|-----------------|------------------|-------------------|------------------|
|                          | CO <sub>2</sub>                              | CH <sub>4</sub> | N <sub>2</sub> O | CO <sub>2</sub> e | Percent of Total |
| Mobile Source            | 3,166.0                                      | 0.2             | 0.2              | 3,236.0           | 56               |
| Area Source              | 142.0                                        | 0.2             | <0.1             | 148.0             | 3                |
| Energy Source            | 1,906.0                                      | 0.1             | <0.1             | 1,912.0           | 33               |
| Water Source             | 33.9                                         | 0.8             | <0.1             | 60.6              | 1                |
| Waste Source             | 124.0                                        | 12.4            | 0.0              | 433.0             | 7                |
| <b>Total Operational</b> |                                              |                 |                  | <b>5,789.6</b>    | <b>100.0</b>     |

Source: Compiled by LSA (February 2023).

Note = Some values may not appear to add up correctly due to rounding.

CH<sub>4</sub> = methane

CO<sub>2</sub>e = carbon dioxide equivalent

CO<sub>2</sub> = carbon dioxide

N<sub>2</sub>O = nitrous oxide

As shown in Table 4.H, the proposed project would generate approximately 5,789.6 metric tons of CO<sub>2</sub>e annually.

The Kings County Association of Government Final Regional Climate Action Plan (Regional CAP) meets the requirements for a Qualified GHG Reduction Strategy and is designed to streamline environmental review of future development projects in the County consistent with *State CEQA Guidelines* Section 15183.5(b). However, the Regional CAP identifies emission reduction goals to reduce GHG emissions in the region by 15 percent below the 2005 emissions levels by 2020, consistent with Assembly Bill (AB) 32. The proposed project would not be operational until post-2020; therefore, because the Regional CAP was prepared based on the 2020 GHG targets, which are now superseded by the 2030 GHG targets established in Senate Bill (SB) 32, the Regional CAP would not be applicable for CEQA streamlining.

In addition, the SJVAPCD has not established a numeric threshold for GHG emissions. As discussed, the significance of GHG emissions may be evaluated based on locally adopted quantitative thresholds or consistency with a regional GHG reduction plan (such as a Climate Action Plan). Neither the City of Hanford, nor the SJVAPCD has developed or adopted numeric GHG significance thresholds. Therefore, the proposed project was analyzed for consistency with the 2022 Scoping Plan.

The 2022 Scoping Plan includes key project attributes that reduce operational GHG emissions in Appendix D, Local Actions<sup>27</sup>, of the 2022 Scoping Plan. As discussed in Appendix D of the 2022 Scoping Plan, absent consistency with an adequate, geographically specific GHG reduction plan such as a CEQA-qualified CAP, the first approach the State recommends for determining whether a proposed residential or mixed-use residential development would align with the State's climate goals is to examine whether the project includes key project attributes that reduce operational GHG emissions while simultaneously advancing fair housing. The following project attributes result in reduced GHG emissions from residential and mixed-use development. Residential and mixed-use projects that have all of the key project attributes in Table 4.I would accommodate growth in a manner consistent with State GHG reduction and equity prioritization goals.

<sup>27</sup> CARB, 2022. *2022 Scoping Plan Appendix D Local Actions*. November. Website: <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-d-local-actions.pdf> (accessed March 2023).



**Table 4.I: Project Consistency with the 2022 Scoping Plan Key Residential and Mixed-Use Project Attributes that Reduce GHGs**

| Priority Areas                        | Key Project Attribute                                                                                                                                                                                                                                            | Project Consistency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Transportation Electrification</b> | Provides EV charging infrastructure that, at minimum, meets the most ambitious voluntary standard in the California Green Building Standards Code at the time of project approval.                                                                               | <b>Consistent with Mitigation Measure GHG-1.</b> CALGreen requires provision of infrastructure to accommodate EV chargers. It is not yet known whether the proposed project would include electric vehicle charging; therefore, implementation of Mitigation Measure GHG-1 would be required to ensure the proposed project would provide electric vehicle charging. With implementation of Mitigation Measure GHG-1, the proposed project would be consistent with this key project attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>VMT Reduction</b>                  | Is located on infill sites that are surrounded by existing urban uses and reuses or redevelops previously undeveloped or underutilized land that is presently served by existing utilities and essential public services (e.g., transit, streets, water, sewer). | <b>Consistent.</b> The project site is located in an area with a mix of land uses, including residential, commercial, and medical uses that are presently served by existing utilities and essential public services (e.g., transit, streets, water, sewer). In addition, as discussed in Section 4.17, the proposed project would result in a less-than-significant VMT impact. Therefore, the proposed project would be consistent with this key project attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                       | Does not result in the loss or conversion of natural and working lands.                                                                                                                                                                                          | <b>Consistent.</b> The project site is classified as Grazing Land and is not zoned for agricultural uses or enrolled in a Williamson Act Contract. The State Department of Conservation classifies the project site as Non-Enrolled Land. The project site is not located on land that is designated as Prime Farmland or Farmland of State Importance. In addition, the project site is currently vacant and is not zoned for agricultural uses. As such, the proposed project would be consistent with this key project attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                       | Consists of transit-supportive densities (minimum of 20 residential dwelling units per acre) or is in proximity to existing transit stops (within a half mile), or satisfies more detailed and stringent criteria specified in the region's SCS.                 | <b>Consistent.</b> The proposed project would not include 20 residential dwelling units per acre; however, the project site is located within 0.25 mile of a transit stop. In addition, the proposed project would develop a medical and mixed-use development and would construct 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements. In addition, the proposed project would include apartments that allow employees of the project medical office and service facilities to live within walking distance. The proposed project would also provide pedestrian infrastructure connecting to neighboring uses. The roads serving the project are designed for low speed and would be conducive to bicycle use. As such, the project would promote initiatives to reduce vehicle trips and VMT and would increase the use of alternate means of transportation. |

**Table 4.I: Project Consistency with the 2022 Scoping Plan Key Residential and Mixed-Use Project Attributes that Reduce GHGs**

| Priority Areas                  | Key Project Attribute                                                                                                                                                                                                                                                                                                                                                                                                           | Project Consistency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                 | As such, the proposed project would be consistent with this key project attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                 | Reduces parking requirements by: eliminating parking requirements or including maximum allowable parking ratios (i.e., the ratio of parking spaces to residential units or square feet); or providing residential parking supply at a ratio of less than one parking space per dwelling unit; or for multifamily residential development, requiring parking costs to be unbundled from costs to rent or own a residential unit. | <b>Consistent.</b> The proposed project would consist of 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses. The proposed project would provide 1,466 parking spaces throughout the project site. Based on the proposed uses when compared to the number of parking spaces, the proposed project would be consistent with this key project attribute.                                                                                              |
|                                 | At least 20 percent of units included are affordable to lower-income residents.                                                                                                                                                                                                                                                                                                                                                 | <b>Consistent.</b> The proposed project would not include affordable residential units. However, the proposed project would include apartments that allow employees of the project medical office and service facilities to live within walking distance. In addition, the proposed project would include Skilled Nursing Facility, Memory Care, Assisted Living Facility uses. Although the proposed project would not include affordable housing, the proposed project would provide needed multi-family and senior housing. Therefore, the proposed project would be consistent with this key project attribute. |
|                                 | Results in no net loss of existing affordable units.                                                                                                                                                                                                                                                                                                                                                                            | <b>Consistent.</b> The proposed project would not result in the removal of any existing residential units. As such, the proposed project would be consistent with this key project attribute.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Building Decarbonization</b> | Uses all-electric appliances without any natural gas connections and does not use propane or other fossil fuels for space heating, water heating, or indoor cooking.                                                                                                                                                                                                                                                            | <b>Consistent</b> The proposed project would be consistent with State building code requirements as Title 24 advances to implement the building decarbonization goals from the 2022 Scoping Plan. As such, the proposed project would be consistent with this key project attribute.                                                                                                                                                                                                                                                                                                                                |

Source: Compiled by LSA (February 2023).

With implementation of Mitigation Measure GHG-1, the proposed project would be consistent with the 2022 Scoping Plan key residential and mixed-use project attributes related to EV charging requirements and building electrification. Therefore, with implementation of Mitigation Measure GHG-1, the proposed project would be consistent with all project attributes in the 2022 Scoping Plan GHG emission thresholds.

**Mitigation Measure GHG-1**

In order to meet the 2022 Scoping Plan greenhouse gas (GHG) requirements, consistent with State GHG reduction and equity prioritization goals, the proposed project shall provide electric vehicle charging capabilities that meet the most ambitious

voluntary standard in the California Green Building Standards Code at the time of project approval as part of the final project design.

Implementation of Mitigation Measure GHG-1 would ensure that the proposed project would be consistent with all project attributes in the 2022 Scoping Plan GHG emission thresholds. As such, the proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Impacts would be less than significant with mitigation.

*b. Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

The following analysis evaluates the proposed project's consistency with adopted plans to reduce GHG emissions. The City of Hanford adopted the Regional CAP in 2014. The CAP includes a GHG inventory, a benchmarking/goal-setting process, and identifies a reduction target for 2020. This allowed the City to take advantage of the streamlining provisions contained in the *State CEQA Guidelines* amendments adopted for SB 97 and clarifications provided in the CEQA Guidelines amendments adopted on December 28, 2018. Although the CAP does not include a target for 2030, the measures in the plan will continue to provide reductions after the milestone year and help demonstrate continued progress toward achieving the SB 32 2030 target.

**Regional CAP.** The CAP includes a number of policies that support emission reductions from new development. The applicable policies and a discussion of the project's consistency with the policies are provided in Table 4.J. The project is consistent with all applicable policies.

In summary, the proposed project would incorporate a number of features that would minimize GHG emissions. These features are consistent with project-level strategies identified by the Regional CAP and CARB's Scoping Plan. As demonstrated in the impact analysis above, the proposed project would not significantly hinder or delay the State's ability to meet the reduction targets contained in AB 32 or SB 32 or conflict with implementation of the Scoping Plan. The proposed project would promote the goals of the Scoping Plan through implementation of design measures that reduce energy consumption, water consumption, and reduction in VMT. Therefore, the proposed project would not conflict with any plans to reduce GHG emissions. The impact would be less than significant. No mitigation would be required.

**Table 4.J: Consistency with the Regional Climate Action Plan**

| Climate Action Plan Policy                                                                                                                                                                                               | Project Consistency                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E-4.1</b> Encourage local homebuilders to participate in the New Solar Homes Partnership to install solar PV systems on qualifying new homes. (Community)                                                             | <b>Consistent.</b> The proposed project would comply with the latest CALGreen solar readiness and installation requirements.                                                           |
| <b>E-4.2</b> Work with the building industry to incorporate designs improving solar readiness into building plans through voluntary green building guidelines. (Community)                                               | <b>Consistent.</b> The proposed project would comply with the latest CALGreen solar readiness and installation requirements.                                                           |
| <b>E-5.2</b> Provide project applicants with green building resources, including the SJVAPCD's Best Performance Standards list for GHG reductions, and promote workshops offered by community organizations. (Community) | <b>Consistent..</b> The proposed project would include sustainability features in the project design in accordance with SJVAPCD requirements, CALGreen, and City of Hanford standards. |



**Table 4.J: Consistency with the Regional Climate Action Plan**

| Climate Action Plan Policy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Project Consistency                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TL-1.1</b> Support and encourage mixed-use and medium- and high-density land use categories located within ¼ mile of a transit stop, park and ride facility, or existing developed areas, by allowing flexible zoning and/or density bonuses for applicable projects. (Community)                                                                                                                                                                                                                                                      | <b>Consistent.</b> The project site is located within 0.25 mile of a transit stop. The proposed project would consist of mixed uses with high-density residential, hotel, and medical office uses.                    |
| <b>TL-1.2</b> Prioritize infill development by publicly providing the location and zoning of infill sites on the local jurisdiction's website and working with developers to expedite applications. (Community)                                                                                                                                                                                                                                                                                                                           | <b>Consistent.</b> The project site is an infill location.                                                                                                                                                            |
| <b>TL-1.3</b> Allow live/work developments that permit residents to live at their place of work and thereby reduce VMT and associated GHG emissions. (Community)                                                                                                                                                                                                                                                                                                                                                                          | <b>Consistent.</b> The proposed project would include apartments that allow employees of the project medical office and service facilities to live within walking distance.                                           |
| <b>TL-2.3</b> Establish minimum design criteria for bicycle and pedestrian circulation and implement through the design review process. (Community)                                                                                                                                                                                                                                                                                                                                                                                       | <b>Consistent.</b> The proposed project would provide pedestrian infrastructure connecting to neighboring uses. The roads serving the project are designed for low speed and would be conducive to bicycle use.       |
| <b>TL-2.4</b> Encourage the installation of adequate and secure bicycle parking at all multi-family residential, commercial, governmental, and recreational locations throughout the region. (Community)                                                                                                                                                                                                                                                                                                                                  | <b>Consistent.</b> The proposed project would comply with CALGreen Code requirements for bicycle parking.                                                                                                             |
| <b>TL-2.5</b> Support land use planning that will promote pedestrian and bicyclist access to and from new development by encouraging land use and subdivision designs that provide safe bicycle and pedestrian circulation, including bicycle parking facilities and internal bicycle and pedestrian routes, where feasible. (Community)                                                                                                                                                                                                  | <b>Consistent.</b> The proposed project would comply with all applicable City design standards related to safe bicycle and pedestrian circulation.                                                                    |
| <b>TL-3.4</b> Support and encourage new development that provides safe routes to adjacent transit stops, where applicable. (Community)                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Consistent.</b> The proposed project would comply with City design standards that provide a safe route to a nearby transit stop.                                                                                   |
| <b>TL-4.2</b> Work with employers and developers to provide affordable transportation alternatives and telecommuting options to serve both new and existing land uses. (Community)                                                                                                                                                                                                                                                                                                                                                        | <b>Consistent.</b> The proposed project's tenants would be able to participate in commute services offered by the Kings County Association of Governments and the City.                                               |
| <b>TL-4.3</b> Support compliance with SJVAPCD Rule 9410 by providing guidance and resources to employers required to comply with the eTRIP Rule. The eTRIP Rule requires employers with over 100 eligible employees to establish an Employer Trip Reduction Implementation Plan (eTRIP) to encourage employees to reduce single-occupancy vehicle trips by providing end of trip facilities such as preferential parking for vanpools and rideshare, bicycle parking, and other facilities suitable for the type of business. (Community) | <b>Consistent.</b> Tenants with over 100 eligible employees would be required to prepare an eTrip Plan that provides programs and measures that encourage ridesharing and use of alternative modes of transportation. |
| <b>TL-5.2</b> Allow the joint use of parking facilities for both private businesses and public agencies. (Community)                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Consistent.</b> The parking lots would serve multiple businesses located throughout the complex.                                                                                                                   |

Source: Kings County Association of Governments (2014) and LSA (March 2023).

## 4.9 HAZARDS AND HAZARDOUS MATERIALS

|                                                                                                                                                                                                                                                                                   | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|-------------------------------------|
| Would the project:                                                                                                                                                                                                                                                                |                                      |                                                             |                                     |                                     |
| a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?                                                                                                                                           | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?                                                                                   | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?                                                                                                                   | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?                                                    | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?                                                                                                                                                         | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?                                                                                                                                           | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

### *a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

The proposed project would develop a medical and mixed-use development and would construct 15 buildings consisting of medical outpatient clinic services, hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements.

Construction activities associated with the proposed project would involve the use of limited amounts of potentially hazardous materials, including but not limited to, solvents, paints, fuels, oils, and transmission fluids. However, all materials used during construction would be contained, stored, and handled in compliance with applicable standards and regulations established by the Department of Toxic Substances Control (DTSC), the U.S. Environmental Protection Agency (USEPA), and the Occupational Safety and Health Administration (OSHA). No manufacturing, industrial, or other uses utilizing large amounts of hazardous materials would occur within the project site.

Project operation would involve the use of common materials associated with residential, commercial, office, and medical uses (i.e., cleaning products, fertilizers, pesticides, herbicides, etc.) that could be potentially hazardous if handled improperly or ingested. However, these products are not considered acutely hazardous and are not generally considered unsafe. All storage, handling, and disposal of hazardous materials during project construction and operation would comply with applicable standards and regulations. The proposed residential uses would not generate significant amounts of any hazardous materials. Therefore, the proposed project would have a less-than-significant impact associated with the routine transport, use, or disposal of hazardous materials.

*b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

See Response 4.9.a, above. The proposed project would not result in a significant hazard to the public or the environment through a reasonably foreseeable upset or accident condition related to the release of hazardous materials. This impact would be less than significant.

*c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

The closest existing school is Roosevelt Elementary School, located approximately 0.1 mile south of the project site. As previously stated, the proposed project would not result in the use or emission of substantial quantities of hazardous materials that would pose a human or environmental health risk. In addition, all materials would be handled, stored, and disposed of in accordance with applicable standards and regulations. Therefore, because the proposed project does not involve activities that would result in the emission of hazardous materials or acutely hazardous substances, implementation of the proposed project would result in a less-than-significant impact in the use or emission of hazardous materials that would adversely affect an existing school.

*d. Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?*

According to the DTSC EnviroStor database,<sup>28</sup> the project site is not located on a federal superfund site, State response site, voluntary cleanup site, school cleanup site, evaluation site, school investigation site, military evaluation site, tiered permit site, or corrective action site. The project site is not included on the list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.<sup>29</sup> As a result, no impacts related to this issue are anticipated.

<sup>28</sup> California Department of Toxic Substances Control. 2019. EnviroStor. Website: [www.envirostor.dtsc.ca.gov/public](http://www.envirostor.dtsc.ca.gov/public) (accessed March 2023).

<sup>29</sup> California Environmental Protection Agency. 2019. *Government Code Section 65962.5(a)*. Website: [calepa.ca.gov/sitecleanup/corteselist/section-65962-5a/](http://calepa.ca.gov/sitecleanup/corteselist/section-65962-5a/) (accessed March 2023).



- e. Would the project be located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?*

The Hanford Municipal Airport is the closest airport and is located approximately 1.5 miles southeast of the project site. Although the project is located within 2 miles of the airport, implementation of the proposed project is not expected to result in a safety hazard or excessive noise for people residing or working in the project area. In addition, the project site is not within noise contours of the airport. As such, impacts would be less than significant. No mitigation is required.

- f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

The project site is not located along an emergency evacuation route. Vehicular access to the site would be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right of way. The proposed project would also construct a roundabout, which would also be dedicated as public right of way and would be constructed to Caltrans or City-approved standards. As part of the project, Glendale Avenue would be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle would be removed, and Glendale Avenue would be realigned using speed-specific design curves. Any new portions of Glendale Avenue would be dedicated as public right of way and any portion of existing right of way not used would be abandoned. 5th Street would be extended starting at the existing alignment before realigning to the roundabout. Therefore, project implementation would not physically interfere with emergency evacuation or the City Fire Department access to and from the project site. Therefore, impacts would be less than significant as a result of project implementation and no mitigation is required.

- g. Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?*

Wildland fires occur in geographic areas that contain the types and conditions of vegetation, topography, weather, and structure density susceptible to risks associated with uncontrolled fires that can be started by lightning, improperly managed campfires, cigarettes, sparks from automobiles, and other ignition sources. According to the California Department of Forestry and Fire Protection (CAL FIRE) Very High Fire Hazard Severity Zone (VHFHSZ) Map for Kings County, the project site is not located within a High or Very High Fire Hazard Severity Zone.<sup>30</sup> Therefore, implementation of the proposed project would not expose people to significant risk of loss, injury, or death due to wildland fires and this impact would be less than significant.

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<sup>30</sup> California Department of Forestry and Fire Protection (CAL FIRE). 2007. *Fire Hazard Severity Zone in Local Resource Area (LRA)*. September 20. Website: [osfm.fire.ca.gov/media/6689/fhszl06\\_1\\_map16.pdf](https://osfm.fire.ca.gov/media/6689/fhszl06_1_map16.pdf) (accessed March 2023).

## 4.10 HYDROLOGY AND WATER QUALITY

|                                                                                                                                                                                                                        | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                                                                                                                     |                                      |                                                             |                                     |                          |
| a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?                                                                              | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?                                  | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| i. Result in substantial erosion or siltation on- or off-site;                                                                                                                                                         | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;                                                                                             | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or                             | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| iv. Impede or redirect flood flows?                                                                                                                                                                                    | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?                                                                                                                    | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?                                                                                                | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |

*a. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?*

The proposed project is located in the City of Hanford and Kings County, which is within the jurisdiction of the Central Valley RWQCB.

Pollutants of concern during construction include eroded sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and other construction-related chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. During construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion and sedimentation compared to existing conditions. In addition, there is a potential for chemicals, petroleum products, other liquids (such as paints and solvents), and concrete-related waste to be spilled or leaked and transported via storm runoff into a stormwater drainage basin.

The project site is approximately 39.23-acres. Because construction of the proposed project would disturb greater than 1 acre of soil, the proposed project would be subject to the requirements of the NPDES Construction General Permit (CGP). To prevent significant water quality impacts during

ground-disturbance activities, the proposed project would need to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) that includes construction BMPs that comply with the requirements of the CGP. These requirements are included in Mitigation Measure HYDRO-1.

**Mitigation Measure HYDRO-1** To minimize any potential short-term water quality effects from project-related construction activities, the project contractor shall implement Best Management Practices (BMPs) in conformance with the California Storm Water Best Management Practice Handbook for Construction Activity. In addition, the proposed project shall be in compliance with existing regulatory requirements, including the Water Pollution Control Preparation (WPCP) Manual. In addition, implementation of a Storm Water Pollution Prevention Plan (SWPPP) would be required under the National Pollutant Discharge Elimination System (NPDES) to regulate water quality associated with construction activities.

During operation of the proposed project, expected pollutants of concern include chemicals, liquid products, petroleum products (such as paints, solvents, and fuels), and waste that may be spilled or leaked and have the potential to be transported via runoff during periods of heavy precipitation. The proposed project would increase impervious surface area, which would increase the volume of runoff during a storm and more effectively transport pollutants to receiving waters. In addition, an increase in impervious surface area would increase the total amount of pollutants in the storm water runoff, which would increase the amount of pollutants discharged to downstream receiving waters. In order to avoid impacts to water quality during project operation, the proposed project would need to prepare and implement a Storm Water Management Plan (SWMP) to reduce the discharge of pollutants of concern to the maximum extent practicable.

**Mitigation Measure HYDRO-2** To reduce the potential for degradation of surface water quality during project operation, a Storm Water Management Plan (SWMP) shall be prepared for the proposed project. The SWMP shall describe specific programs to minimize storm water pollution resulting from the proposed project. Specifically, the SWMP shall identify and describe source control measures, treatment controls, and BMP maintenance requirements to ensure that the project complies with post-construction storm water management requirements of the Regional Water Quality Control Board (RWQCB).

With implementation of Mitigation Measure HYDRO-1 and Mitigation Measure HYDRO-2, the proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. Therefore, the project's impacts would be less than significant with mitigation incorporated.



*b. Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?*

Groundwater was not encountered up to a depth of 45 feet below ground surface (bgs) during geotechnical borings on the project site.<sup>31</sup> Therefore, due to the depth to the groundwater table and the depth of excavation, dewatering of the groundwater table would not be required. Although excavation would occur well above existing groundwater levels, perched groundwater could be present beneath the project site. As such, groundwater dewatering of perched groundwater may be required during construction. Groundwater dewatering would not substantially affect groundwater supplies or recharge because groundwater dewatering would be temporary, would cease after project construction, and would only affect perched groundwater. Therefore, construction impacts related to depletion of groundwater supplies or interference with groundwater recharge would be less than significant, and no mitigation would be required.

Currently, the project site is vacant and undeveloped. Development of the proposed project would increase impervious surfaces on the project site, which would decrease on-site infiltration. However, due to the depth to groundwater, it is unlikely that groundwater recharge from stormwater infiltration currently occurs on the project site. Regardless, any decrease in infiltration would be minimal in comparison to the size of the watershed and the amount of existing impervious surface area in the vicinity of the project area. Furthermore, project operation would not include groundwater extraction. Therefore, the proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin, and impacts would be less than significant.

*c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:*

*i. Result in substantial erosion or siltation on- or off-site;*

During construction activities, soil would be exposed and disturbed, drainage patterns would be temporarily altered during grading and other construction activities, and there would be an increased potential for soil erosion and siltation compared to existing conditions. Additionally, during a storm event, soil erosion and siltation could occur at an accelerated rate. As discussed above in Response 4.10.a, Mitigation Measure HYDRO-1 requires compliance with applicable permits and preparation of a SWPPP to identify construction BMPs to be implemented as part of the proposed project to reduce impacts to water quality during construction, including those impacts associated with soil erosion and siltation. Compliance with applicable permit requirements and implementation of the construction BMPs would ensure that construction impacts related to on- or off-site erosion or siltation would be reduced to less than significant with mitigation incorporated.

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<sup>31</sup> Kleinfelder. 2020, op. cit.

Once operational, implementation of the proposed project would result in new internal access roads and surface parking lots, increasing impervious surface area which is not prone to erosion or siltation. The project would also include landscaping that would minimize erosion and siltation. The project site would be designed for storm water to be captured by the storm drain system, which would be collected by an underground conveyance system and delivered to the onsite bio infiltration basin. The basin would be privately held by the owners and would collect both the proposed project and the City right of way. All storm drain facilities would be designed to City standards. The proposed project would also convert the Peoples Ditch to a 66-inch-diameter below-ground pipeline where the ditch currently exists. The depth of the below-ground pipeline would be between two and six feet. Therefore, on-site flooding, erosion, and siltation would not occur. This impact would be less than significant.

*ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;*

During construction activities, soil would be exposed and disturbed, drainage patterns would be temporarily altered during grading and other construction activities, and there would be an increased potential for flooding compared to existing conditions. Additionally, during a storm event, flooding could occur at an accelerated rate. As discussed above in Response 4.10.a, Mitigation Measure HYDRO-1 requires compliance with applicable permits and preparation of a SWPPP to identify construction BMPs to be implemented as part of the proposed project to manage and convey storm water during construction. Proper management of storm water during construction would reduce impacts associated with flooding. Therefore, impacts related to on- or off-site flooding would be less than significant with mitigation incorporated.

Once operational, the proposed project would increase impervious surface area on the site and could potentially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. However, as discussed previously, the project site would be designed for storm water to be captured by the storm drain system, which would be collected by an underground conveyance system and delivered to the onsite bio infiltration basin. The basin would be privately held by the owners and would collect both the proposed project and the City right of way. All storm drain facilities would be designed to City standards. The proposed project would also convert the Peoples Ditch to a 66-inch-diameter below-ground pipeline where the ditch currently exists. Therefore, the proposed project would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site. As such, operational impacts related to on-site or off-site flooding would be less than significant.

*iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or*

As discussed above in Response 4.10.a, there is a potential for sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals to be spilled or leaked and transported via storm runoff into stormwater basins. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. Drainage patterns would be temporarily altered during grading and other construction activities, and construction-related pollutants could be spilled, leaked, or transported via storm runoff into

adjacent drainages and stormwater basins. Mitigation Measure HYDRO-1 requires compliance with applicable permits and preparation of a SWPPP to identify construction BMPs to be implemented as part of the proposed project to manage and convey storm water during construction. Therefore, construction of the proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. Impacts would be less than significant with mitigation incorporated.

In addition, as discussed above in Response 4.10.a, expected pollutants of concern during operation of the proposed project include chemicals, liquid products, petroleum products (such as paints, solvents, and fuels), and waste that may be spilled or leaked and have the potential to be transported via runoff during periods of heavy precipitation. The proposed project would increase impervious area, which would increase the volume of runoff during a storm and more effectively transport pollutants to receiving waters. In addition, an increase in impervious surface would increase the total amount of pollutants in the storm water runoff, which would increase the amount of pollutants discharged to downstream receiving waters.

As discussed previously, the project site would be designed for storm water to be captured by the storm drain system, which would be collected by an underground conveyance system and delivered to the onsite bio infiltration basin. The basin would be privately held by the owners and would collect both the proposed project and the City right of way. All storm drain facilities would be designed to City standards. The proposed project would also convert the Peoples Ditch to a 66-inch-diameter below-ground pipeline where the ditch currently exists. Therefore, operation of the proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. Impacts would be less than significant.

*iv. Impede or redirect flood flows?*

Refer to Response 4.10.a.ii above. With implementation of Mitigation Measure HYDRO-1, implementation of the proposed project would not impede or redirect flood flows. This impact would be less than significant with mitigation incorporated.

*d. In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?*

Tsunamis are sea waves of unusual size that occur from significant earthquakes either under the ocean floor or adjacent to shorelines and can travel great distances to impact low-lying communities and developments. Considering that the Coast Range protects the site from the sea, the potential to be affected by a tsunami is nil. A seiche is a free or standing wave oscillation that occurs in a confined body of water, such as a reservoir or lake. Earthquake-generated ground waves, which have a period that matches the natural period of the lake or reservoir, may cause the water to oscillate, which can cause damage to shoreline improvements. The Kings County General Plan



indicates that earthquake-induced seiches are not considered a risk within the vicinity of the project site.<sup>32</sup>

According to the Kings County General Plan, two major dams could cause substantial flooding in Kings County in the event of a failure: Pine Flat and Terminus Dams. The project site is located within an area of potential flooding due to dam failure of Pine Flat Dam. However, the Kings County General Plan does not state the potential inundation depth in the event of failure of Pine Flat Dam. The project site is not located within potential flooding of the Terminus Dam.

According to the Federal Emergency Management Agency (FEMA), the majority of the project site lies within a Zone X flood designation (Map Number 06031C0185C, dated June 16, 2009). Areas within Flood Zone X are outside of the 500-year floodplain. According to FEMA, “the areas of minimal flood hazard, which are the areas outside the Special Flood Hazard Area (SFHA) and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded)”. Therefore, the project site lies outside of the 100-year floodplain and the designated SFHA. Therefore, implementation of the proposed project would not place housing within a flood hazard area, and a less-than-significant impact would result related to flood hazards.

*e. Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

As discussed above in Response 4.10.a, during construction activities, excavated soil would be exposed with an increased potential to expose soils to wind and water erosion, which could result in temporary minimal increases in sediment load in nearby water bodies. Pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals and have the potential to be transported via stormwater runoff into receiving waters. However, Mitigation Measure HYDRO-1 would ensure implementation of BMPs and would require implementation of a SWPPP to control stormwater runoff and discharge of pollutants.

In addition, as discussed above in Response 4.10.a, operation of the proposed project could result in surface water pollution associated with chemicals, liquid products, petroleum products (such as paints, solvents, and fuels), and waste that may be spilled or leaked and have the potential to be transported via runoff during periods of heavy precipitation. As required by Mitigation Measure HYDRO-2, the proposed project would implement a SWMP, which shall identify and describe source control measures, treatment controls, and BMP maintenance requirements to ensure that the project complies with post-construction storm water management requirements of the RWQCB.

For the reasons discussed above, with implementation of Mitigation Measures HYDRO-1 and HYDRO-2, the proposed project would not result in water quality impacts that would conflict with the RWQCB’s Water Quality Control Plan (Basin Plan). Therefore, impacts related to conflict with a water quality control plan would be less than significant.

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<sup>32</sup> Kleinfelder. 2020, op. cit.

## 4.11 LAND USE AND PLANNING

|                                                                                                                                                                                        | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                                                                                     |                                      |                                                             |                                     |                          |
| a. Physically divide an established community?                                                                                                                                         | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### *a. Would the project physically divide an established community?*

The project site is located in an area with a mix of land uses, including residential, commercial, and medical uses. Adjacent parcels consist mostly of low-density residential and commercial uses, with several undeveloped lots located north of the project site. The project site is generally bound to the north by the San Joaquin Valley Railroad and existing mixed-use structures, including commercial, medical, retail, and some residential uses, to the east by commercial land uses, to the south by SR-198, and to the west by commercial land uses.

The proposed project is located within a generally urbanized area of the City. The project site is currently undeveloped; however, as identified above, it is bordered by low-density residential and commercial uses. The proposed project would develop the project site with a new mixed-use development on an infill site. Although other land uses are located within the vicinity of the project site, none of these uses would be encroached upon or divided by project development. In addition, the project would not disturb or alter access to any existing adjacent uses. Therefore, the proposed project would not physically divide an established community. This impact would be less than significant.

### *b. Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?*

The main documents regulating land use on the project site include the City's General Plan and the Zoning Ordinance. The General Plan designation for the project site is currently Highway Commercial and the current zoning designation is C-H. The proposed project would develop a medical and mixed-use development and would construct 15 buildings consisting of medical outpatient clinic services, hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses. Medical uses, education uses, and multi-family are not consistent with the land uses allowed in the Highway Commercial designation. Therefore, a change in the General Plan and zoning designations are required.

The project would amend the General Plan to Service Commercial and High-Density Residential. In addition, the project would require a rezone to C-S and R-H with a PUD overlay that would allow uses allowed on the entire project site. This zoning designation and PUD would allow uses from both zones to be constructed anywhere on the project site.

**General Plan.** The City's General Plan is the fundamental policy document of the City of Hanford. Within the General Plan, the Land Use and Community Design Element is the principal document guiding land use and development within the City. It serves as a blueprint for development throughout the community and is the vehicle through which the community needs, desires, and aspirations are balanced.

As identified above, without a General Plan amendment, the proposed project is inconsistent with the policies of the General Plan as they pertain to the existing Highway Commercial designation. The proposed project would amend the General Plan to Service Commercial and High-Density Residential.

**Service Commercial.** The Service Commercial designation provides a broad range of commercial activities such as businesses which have both retail and service components along SR-198.

The proposed project would be consistent with applicable Land Use and Community Design Element policies:

- **Policy L51 Purpose of Service Commercial Land Use Designation:** Establish the Service Commercial land use designation to provide for establishments that engage in servicing equipment, materials, products and related sales and travel conveniences, but which do not require the manufacturing, assembly, packaging or processing of articles or merchandise for distribution.
- **Policy L52 Typical Uses in Service Commercial Land Use Designation:** Define the uses allowed in the Service Commercial land use designation to include a broad range of commercial activities such as businesses which have both retail and service components. Among these are uses such as vehicle sales and service; auto rental and equipment rental; motels; restaurants (including fast food); service stations; car washes; building material supply; warehousing; wholesale trade; contractors, suppliers, small equipment yards; and other similar uses.
- **Policy L53 Existing Service Commercial Designations:** Encourage existing service commercial centers to expand or adapt to market changes through reuse, rehabilitation, and infill development.
- **Policy L54 Design of the Service Commercial Land Use Designation:** Require that new development projects and major site reconfigurations in the Service Commercial land use designation provide site layouts, landscaping, and screening so that the site appears aesthetically pleasing from the public street.
- **Policy L55 Location and Size of Service Commercial Land Use Designation:** Locate Service Commercial land use designations along Highway 198 and where they can serve as a buffer land use, such as between residential areas and railroad corridors. Require new development projects to be a minimum of one acre.



The proposed medical outpatient clinic services, hotel and conference center, specialized education, retail, and medical office, land uses would be consistent with the allowable uses within the Service Commercial designation. The project site is located along SR-198, consistent with Policy L55.

**High-Density Residential.** The High-Density Residential designation allows a density range of 14 to 29 units per gross acre with an expected typical density of 16 units per gross acre.

The proposed project would be consistent with applicable Land Use and Community Design Element policies:

- **Policy L38 Purpose of the High Density Residential Land Use Designation:** Establish the High-Density Residential land use designation primarily for multi-family apartment and condominium development in proximity to arterial streets, commercial and recreation facilities, and employment centers.
- **Policy L39 Typical Uses in the High-Density Residential Land Use Designation:** Define the uses allowed in the High-Density Residential land use designation to include multi-family residential dwellings in apartment buildings complexes.
- **Policy L40 Design of the High-Density Residential Land Use Designation:** Develop and enforce design policies and/or ordinances for High-Density Residential developments that ensure high-quality constructions design, open space amenities, safety and security, overall compatibility with the rest of the neighborhood.
- **Policy L41 Location and Size of the High Density Residential Land Use Designation:** Locate High-Density Residential land use designations in close proximity to Arterial streets, commercial centers, recreational facilities, and employment centers.

The proposed multi-family residential, skilled nursing, and assisted living land uses would be consistent with the allowable uses within the High-Density Residential designation. In addition, project site is located in proximity to arterial streets (11th Avenue), commercial (planned on site), and employment centers (planned on site), consistent with Policy L41.

**Zoning Ordinance.** The current zoning designation for the project site is C-H; however, the project would require a rezone to C-S and R-H with a PUD overlay that would allow uses allowed on the entire project site. This zoning designation and PUD would allow uses from both zones to be constructed anywhere on the project site.

**Service Commercial (C-S).** The C-S zone allows for commercial uses that engage in servicing equipment, materials, products and related sales and travel conveniences, but which do not require the manufacturing, assembly, packaging or processing of articles or merchandise for distribution. The minimum site area must be 5,000 square feet, unless a smaller site is approved with a conditional use permit in accordance with Chapter 17.80. No structure shall be placed within a building setback area, as identified in Section 17.20.060 of the Municipal Code. The

minimum distance between any residential structures shall be 10 feet, except as provided by the building code.

The C-S zone does not require usable open space. Landscaping also must be provided in accordance with Section 17.52 of the Municipal Code. In addition, driveways, parking, signage, mechanical equipment, lighting, and coverings must be designed consistent with City standards. The proposed project would be required to comply with these standards.

**High-Density Residential (R-H).** The R-H zone allows for a density range of 14 to 29 units per gross acre with a minimum site area per dwelling unit of 1,500 square feet. The minimum site area per dwelling unit shall be 1,500 square feet. The maximum coverage of a lot shall be determined by the combined building setback area requirements, accessory structure limitations, open space requirements, and off-street parking. In addition, no structure shall be placed within a building setback area, as identified in Section 17.14.070 of the Municipal Code. The minimum distance between structures shall be 10 feet, except as provided by the building code, and the maximum structure height shall be 35 feet.

Lots with five or more dwelling units shall provide for a usable open space area equal to five percent of the lot area. Where multiple lots that together make up a single development site, the required open space may be combined into common open space areas that are accessible to all residents of the site. Landscaping also must be provided in accordance with Section 17.52 of the Municipal Code. In addition, driveways, parking, signage, mechanical equipment, lighting, and coverings must be designed consistent with City standards. The proposed project would be required to comply with these standards.

**Summary.** Although the proposed project would require a General Plan Amendment and a Zone Change, the proposed uses would be consistent with the proposed General Plan designations and zones. Therefore, the proposed project would be consistent with proposed General Plan and zoning designations and would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. This impact would be less than significant.

## 4.12 MINERAL RESOURCES

|                                                                                                                                                                       | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|-------------------------------------|
| Would the project:                                                                                                                                                    |                                      |                                                             |                                     |                                     |
| a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?                                | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

*a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*

The Surface Mining and Reclamation Act (SMARA) regulates surface mining in California. SMARA was adopted in 1975 to protect the State's need for a continuing supply of mineral resources and to protect the public and environmental health. SMARA requires that all cities incorporate mapped mineral resource designations approved by the State Mining and Geology Board into their General Plans.

The City's General Plan indicates that at this time there are no known significant deposits of minerals, and no active mines.<sup>33</sup> The only mineral commodities that have been found within the City are sand and gravel that could be used for road and building construction. The Monterey Shale lies beneath Kings County and contains both oil and natural gas deposits. However, the City's General Plan states there have been no efforts to date to attempt extraction of these resources within or near the City. Therefore, implementation of the proposed project is not expected to result in the loss of known mineral resources or recovery sites. Therefore, this impact would be less than significant.

*b. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?*

The project site is not located within an area known to contain locally important mineral resources. No impacts related to the loss of availability of a locally important mineral resource recovery site as delineated on a local general plan, specific plan, or other land use plan would occur as a result of project implementation.

<sup>33</sup> Hanford, City of. 2017, op. cit.



### 4.13 NOISE

|                                                                                                                                                                                                                                                                                                         | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project result in:                                                                                                                                                                                                                                                                            |                                      |                                                             |                                     |                          |
| a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?                                                       | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| b. Generation of excessive groundborne vibration or groundborne noise levels?                                                                                                                                                                                                                           | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

This section is based on the Acoustical Analysis prepared for the proposed project.<sup>34</sup> The Acoustical Analysis is included as Appendix E.

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, or sleep. Several noise measurement scales exist that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative intensity of a sound. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness; and similarly, each 10 dB decrease in sound level is perceived as half as loud. Sound intensity is normally measured through the A-weighted sound level (dBA). This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. The A-weighted sound level is the basis for 24-hour sound measurements that better represent human sensitivity to sound at night.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6 dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level ( $L_{eq}$ ) is the total sound energy of time varying noise over a sample period. However, the predominant rating scales for human communities in the State are the  $L_{eq}$ , the community noise equivalent level (CNEL), and the day-night average level ( $L_{dn}$ ) based on A-weighted decibels (dBA). CNEL is the time varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the

<sup>34</sup> WJV Acoustics, Inc. 2021. *Acoustical Analysis Hanford Place Hanford, California WJVA Report No. 20-016*. May 12.

hourly  $L_{eq}$  for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours).  $L_{dn}$  is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours. CNEL and  $L_{dn}$  are within one dBA of each other and are normally exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

A project would have a significant noise effect if it would substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of applicable regulatory agencies, including, as appropriate, the City of Hanford.

The City of Hanford Noise Element of the 2017 General Plan provides generalized Noise Goals and Policies for various noise sources and land uses, related to development within the City. However, the 2017 General Plan does not provide specific noise standards applicable to development projects. Therefore, City staff provided the noise level standards from the City's 2002 General Plan. The standards provided in the 2002 General Plan are the same as those provided in the Kings County General Plan and will be considered the applicable standards for this project.

The 2002 General Plan provided noise level compatibility standards for transportation and non-transportation (stationary) noise sources. Table 4.K provides the City of Hanford 2002 General Plan noise standards for transportation noise sources and Table 4.L provides the City of Hanford 2002 General Plan noise standards for non-transportation (stationary) noise sources.

**Table 4.K: Maximum Allowable Noise Exposure Transportation Noise Sources**

| Land Use                           | Outdoor Activity Areas <sup>1</sup><br>$L_{dn}$ /CNEL, dB | Interior Spaces    |                            |
|------------------------------------|-----------------------------------------------------------|--------------------|----------------------------|
|                                    |                                                           | $L_{dn}$ /CNEL, dB | $L_{eq}$ , dB <sup>2</sup> |
| Residential                        | 60 <sup>3</sup>                                           | 45                 | -                          |
| Transient Lodging                  | 60 <sup>3</sup>                                           | 45                 | -                          |
| Hospitals, Nursing Homes           | 60 <sup>3</sup>                                           | 45                 | -                          |
| Theaters, Auditoriums, Music Halls | -                                                         | -                  | 35                         |
| Churches, Meeting Halls            | 60 <sup>3</sup>                                           | -                  | 40                         |
| Office Buildings                   | -                                                         | -                  | 45                         |
| Schools, Libraries, Museums        | -                                                         | -                  | 45                         |
| Playgrounds, Neighborhoods Parks   | 70                                                        | -                  | -                          |

Source: WJV Acoustics, Inc. (2021).

Notes:

<sup>1</sup> Where the location of outdoor activity areas is unknown, the exterior noise-level standard shall be applied to the property line of the receiving land use.

<sup>2</sup> As determined for a typical worst case hour during periods of use.

<sup>3</sup> Where it is not possible to reduce noise in outdoor activity areas to 60 dB  $L_{dn}$ /CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB  $L_{dn}$ /CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

**Table 4.L: Noise-Level Performance Standards for New Projects Affected by or Including Non-Transportation (Stationary) Noise Sources**

| Category                                         | Noise-Level Descriptor | Exterior Noise Level Standard<br>(Applicable at Property Line) |           | Interior Noise Level Standard |           |
|--------------------------------------------------|------------------------|----------------------------------------------------------------|-----------|-------------------------------|-----------|
|                                                  |                        | Daytime                                                        | Nighttime | Daytime                       | Nighttime |
| Residential                                      | $L_{eq}$               | 50                                                             | 45        | 40                            | 35        |
|                                                  | $L_{max}$              | 70                                                             | 65        | 60                            | 35        |
| Transient Lodging<br>Hospitals,<br>Nursing Homes | $L_{eq}$               | -                                                              | -         | 40                            | 35        |
|                                                  | $L_{max}$              | -                                                              | -         | 60                            | 55        |
| Theaters,<br>Auditoriums,<br>Music Halls         | $L_{eq}$               | -                                                              | -         | 35                            | 35        |
| Churches,<br>Meeting Halls                       | $L_{eq}$               | -                                                              | -         | 40                            | 40        |
| Office Buildings                                 | $L_{eq}$               | -                                                              | -         | 45                            | -         |
| Schools, Libraries,<br>Museums                   | $L_{eq}$               | -                                                              | -         | 45                            | -         |
| Playgrounds,<br>Neighborhood<br>Parks            | $L_{eq}$               | 65                                                             | -         | -                             | -         |

Source: WJV Acoustics, Inc. (2021).

Notes:

Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

Certain land uses are considered more sensitive to noise than others. Examples of these land uses include residential areas, educational facilities, hospitals, childcare facilities, and senior housing. The project site generally bound by SR-198 to the south, San Joaquin Valley Railroad to the north, an existing retail shopping center to the east, and a mini-storage facility and former amusement/water park located west of the project site. The closest sensitive receptors to the proposed project include the residential land uses located north of the project site (across the San Joaquin Valley Railroad line) and south of the project site (across SR-198).

To assess existing noise levels, noise monitoring was conducted to establish the existing ambient noise environment at the project site. Eight short-term (15-minute) and two long-term (24-hour) noise measurements were conducted at the project site on May 5, 2021, and May 6, 2021. Noise measurement data collected during the noise monitoring area summarized in Table 4.M. As shown in Table 4.M, the short-term noise measurements indicate that ambient noise in the project site vicinity ranges from approximately 51.8 dBA to 62.6 dBA  $L_{eq}$ . The measured  $L_{dn}$  value at site LT-1 for May 5th and May 6th was 68.8 dB  $L_{dn}$  and 68.9 dB  $L_{dn}$ , respectively. The measured  $L_{dn}$  value at site LT-2 for May 5th and May 6th was 67.6 dB  $L_{dn}$  and 64.9 dB  $L_{dn}$ , respectively. Vehicle traffic, aircraft, agricultural activities, voices, birds, barking dogs, and a rooster were reported as the primary noise sources.



**Table 4.M: Ambient Noise Monitoring Results (dBA)**

| Location Number | Location Description                                                                                                                                                        | Time                                        | L <sub>eq</sub> <sup>1</sup> | L <sub>max</sub> <sup>1</sup> |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------|-------------------------------|
| LT-1            | Located within the central portion of the project site, approximately 300 feet from the centerline of SR-198.                                                               | Daytime Average<br>(7:00 a.m. – 10:00 p.m.) | 64.5/<br>65.0 <sup>3</sup>   | 81.0/<br>79.1 <sup>3</sup>    |
|                 |                                                                                                                                                                             | Night Average<br>(10:00 p.m. – 7:00 a.m.)   | 60.3/<br>60.5 <sup>3</sup>   | 76.2/<br>77.5 <sup>3</sup>    |
| LT-2            | Located near the northern portion of the project site, adjacent to the existing residential land uses, and approximately 50 feet from the San Joaquin Valley Railroad line. | Daytime Average<br>(7:00 a.m. – 10:00 p.m.) | 59.9/<br>58.0 <sup>3</sup>   | 80.8/<br>79.2 <sup>3</sup>    |
|                 |                                                                                                                                                                             | Night Average<br>(10:00 p.m. – 7:00 a.m.)   | 54.4/<br>51.7 <sup>3</sup>   | 70.8/<br>68.2 <sup>3</sup>    |
| ST-1            | Located near the northeast portion of the project site, in the vicinity of existing retail/commercial land uses adjacent to the project site.                               | 7:35 a.m.                                   | 51.8                         | 56.0                          |
|                 |                                                                                                                                                                             | 4:25 p.m.                                   | 53.7                         | 62.1                          |
| ST-2            | Located near the project site access point along Campus Drive.                                                                                                              | 8:05 a.m.                                   | 62.6                         | 76.3                          |
|                 |                                                                                                                                                                             | 4:45 p.m.                                   | 56.7                         | 62.3                          |
| ST-3            | Located near the northwestern portion of the project site, in the parking lot of Adventist Health Hospital.                                                                 | 8:30 a.m.                                   | 51.9                         | 70.1                          |
|                 |                                                                                                                                                                             | 5:10 p.m.                                   | 52.1                         | 66.6                          |
| ST-4            | Located at the intersection of Campus Drive and 7th Street, north of the project site.                                                                                      | 8:50 a.m.                                   | 60.3                         | 77.0                          |
|                 |                                                                                                                                                                             | 5:30 p.m.                                   | 61.4                         | 74.2                          |

Source: WJV Acoustics, Inc. (2021)

Notes:

<sup>1</sup> L<sub>eq</sub> represents the average of the sound energy occurring over the measurement time period for the short-term noise measurements.

<sup>2</sup> L<sub>max</sub> is the highest sound level measured during the measurement time period.

<sup>3</sup> May 5, 2021 data/May 6, 2021 data

*a. Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

The following section describes how the short-term construction and long-term operational noise impacts of the proposed project would be less than significant with mitigation.

**Traffic Noise Impacts to Off-Site Noise-Sensitive Land Uses.** The Federal Highway Administration (FHWA) Traffic Noise Model was used to quantify expected project-related increases in traffic noise exposure along roadways in the project vicinity based on ADT.

Project-related significant impacts would occur if an increase in traffic noise associated with the project would result in noise levels exceeding the City's applicable noise level standards at the location(s) of sensitive receptors. For the purpose of this analysis a significant impact was also assumed to occur if traffic noise levels were to increase by 3 dB at sensitive receptor locations where noise levels already exceed the City's applicable noise level standards (without the project), as 3 dB generally represents the threshold of perception in change for the human ear.

The City's exterior noise level standard for residential land uses is 60 dB L<sub>dn</sub> (an exterior noise exposure of up to 65 dB L<sub>dn</sub> is allowed in instances where it is not possible to reduce noise exposure in outdoor activity areas to 60 L<sub>dn</sub> or less using a practical application of available noise reduction measures.). Traffic noise was modeled at seven receptor locations. The seven modeled receptors are

located at roadway setback distances representative of the sensitive receptors (residences) along each analyzed roadway segment. The receptor locations are described below:

- R-1: Residential land use located approximately 90 feet from the centerline of Lacey Boulevard.
- R-2: Residential land use located approximately 60 feet from the centerline of 7th Street.
- R-3: Residential land use located approximately 95 feet from the centerline of 7th Street.
- R-4: Residential land use located approximately 60 feet from the centerline of 6th Street.
- R-5: Residential land use located approximately 100 feet from the centerline of Campus Drive.
- R-6: Residential land use located approximately 95 feet from the centerline of 7th Street.
- R-7: Residential land use located approximately 90 feet from the centerline of 6th Street.

Traffic volumes for Existing and Cumulative Year 2042 Conditions without and with project traffic noise levels at these receptor locations are shown in Table 4.N. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn.

**Table 4.N: Project Contribution to Traffic Noise (dB L<sub>dn</sub>)**

| Modeled Receptor | Existing Conditions |              |                      | Cumulative Conditions |              |                      |
|------------------|---------------------|--------------|----------------------|-----------------------|--------------|----------------------|
|                  | Without Project     | Plus Project | Project Contribution | Without Project       | Plus Project | Project Contribution |
| R-1              | 63                  | 63           | 0                    | 64                    | 64           | 0                    |
| R-2              | 62                  | 62           | 0                    | 64                    | 64           | 0                    |
| R-3              | 58                  | 59           | +1                   | 60                    | 60           | 0                    |
| R-4              | 55                  | 58           | +3                   | 56                    | 59           | +3                   |
| R-5              | 51                  | 51           | 0                    | 53                    | 53           | 0                    |
| R-6              | 59                  | 59           | 0                    | 61                    | 61           | 0                    |
| R-7              | 52                  | 52           | 0                    | 54                    | 54           | 0                    |

Source: WJV Acoustics, Inc. (2020).

Note: As discussed in Section 4.17, Transportation, approximately 41,500 square feet of commercial/office uses is proposed. These uses would generate fewer trips than the 114,000 square feet of commercial/office uses that is analyzed in the TIS/proposed project trip generation estimate. Thus, the traffic noise analysis evaluates a project with higher trip generation potential. Therefore, this analysis can be considered conservative.

As shown in Table 4.N, project-related traffic would not result in noise levels at any sensitive receptors to exceed the City's noise level standard, nor result in an increase of more than 3 dB in any sensitive receptor locations where noise levels already exceed the City's noise level standard without the implementation of the project. In addition, the project's contribution to Cumulative 2042 traffic noise exposure levels at the modeled representative receptor locations would not result in noise levels to exceed the City's noise level standard, nor result in an increase of more than 3 dB in any sensitive receptor locations where noise levels already exceed the City's noise level standard without the implementation of the project. Therefore, project-related traffic noise impacts to off-site noise-sensitive land uses would be less than significant. No mitigation is required.

**Stationary Source Noise Impacts.** The proposed project would include a variety of medical buildings, hotel and conference center, medical instruction facilities, retail/drive-thru buildings, commercial buildings and a multi-family apartment building. A wide variety of noise sources can be associated

with these land use designations. The noise levels produced by such sources can also be highly variable and could potentially impact existing off-site and proposed on-site sensitive receptors. Typical examples of stationary noise sources associated with such land uses include: heating ventilation, and air conditioning (HVAC) and mechanical equipment; truck deliveries; parking lot activities; and drive-thru operations. These noise sources are evaluated below.

***Mechanical Equipment.*** It is assumed that the project would include roof-mounted HVAC units on the proposed buildings. The HVAC requirements for the buildings would likely require the use of multiple packaged roof-top units. For the purpose of noise and aesthetics, roof-mounted HVAC units are typically shielded by means of a roof parapet. Based on reference noise level measurements at numerous commercial and retail buildings with roof-mounted HVAC units, associated noise levels typically range between approximately 45-50 dBA  $L_{max}$  at a distance of 50 feet from the building façade.

For this project, the closest residential property lines to any potential roof-mounted HVAC equipment would be located at a minimum setback distance of 200 feet. Taking into account the standard rate of noise attenuation with increased distance from a point source (a reduction of 6 dB per doubling of distance), noise levels associated with the operation of roof-mounted HVAC units would be approximately 33-38 dBA  $L_{max}$  at the closest sensitive receptor property line. These noise levels would not exceed any City of Hanford noise level standard or exceed existing (without project) ambient noise levels. Therefore, potential impacts related to mechanical equipment noise would be less than significant and no mitigation is required.

***Truck Movements.*** At the time of this analysis, a specific truck access route (or routes) had not been designated. However, trucks would access the project site by one of three access points, Glendale Avenue from the west, Campus Drive from the north or 5th Street from the east. It is assumed that truck deliveries would occur at various times and locations throughout the overall project area. Precise details on truck deliveries were not known at the time of this analysis.

Based on reference measurements of the noise levels produced by slowly moving trucks, truck movements would be expected to produce noise levels in the range of 65 to 71 dBA  $L_{max}$  at a distance of 100 feet. The range in measured truck noise levels is due to differences in the size of trucks, their speed of movement and whether they have refrigeration units in operation during the pass-by.

If truck movements were to access the project site via the 5th Street access point, truck movements could occur as close as approximately 130 feet from the closest residential property lines to the north. At this distance, noise levels associated with truck movements would produce maximum noise levels in the range of approximately 63 to 69 dBA  $L_{max}$ , which would not exceed the City's daytime (7:00 a.m. to 10:00 p.m.) noise level standard of 70 dBA  $L_{max}$ , but would have the potential to exceed the City's nighttime (10:00 p.m. to 7:00 a.m.) noise level standard of 65 dBA  $L_{max}$ . Based on the existing ambient noise levels in the vicinity of the future 5th Street access point (noise monitoring site LT-2), the City's nighttime 65 dBA  $L_{max}$  standard was exceeded during twelve of the 18 nighttime hours measured over the two-day monitoring period. However, implementation of Mitigation Measure NOI-1 would reduce potential impacts

related to truck movement noise by requiring truck movements to use the Glendale access point only during nighttime hours.

**Mitigation Measure NOI-1**      **Truck Movements.** All truck movements occurring during nighttime hours of 10:00 p.m. to 7:00 a.m. shall be required to use the Glendale Avenue access point only.

With implementation of Mitigation Measure NOI-1, impacts associated with truck movement noise would be reduced to a less-than-significant level.

**Parking Lot Activities.** Noise due to traffic in parking lots is typically limited by low speeds and is not usually considered to be significant. Human activity in parking lots that can produce noise includes voices, stereo systems and the opening and closing of car doors and trunk lids. Such activities can occur at any time. The noise levels associated with these activities cannot be precisely defined due to variables such as the number of parking movements, time of day and other factors. It is typical for a passing car in a parking lot to produce a maximum noise level of 60 to 65 dBA at a distance of 50 feet, which is comparable to the level of a raised voice.

For this project, parking would be dispersed throughout the overall project area. The closest proposed parking areas would be located at least 150 feet from the closest existing residential property lines to the north. At this distance, maximum parking lot vehicle movements would be expected to be approximately 51 to 56 dBA  $L_{max}$ , which would not exceed any of the City's applicable noise levels standards or exceed existing ambient noise levels at the closest residential land uses. Due to existing elevated ambient noise levels at the closest sensitive receptor locations (residential land uses north of the project site), noise levels associated with parking lot activities would generally not be audible over existing (without project) noise levels. Therefore, potential impacts related to parking lot activity noise would be less than significant and no mitigation is required.

**Drive-Thru Retail.** The proposed project would include two retail areas that would likely include drive-thru operations. While the exact tenants and type of retail store was not known at this time, it is assumed that amplified speech would be incorporated into drive-thru operations.

In order to assess potential project noise levels associated with drive-thru operations, reference noise levels were used from previous noise measurements at a drive-thru restaurant. Based on the previous noise measurements, the microphone used by customers to order food and the loudspeaker used by employees to confirm orders are both integrated into a menu board that is located a few feet from the drive-thru lane at the approximate height of a typical car window. Vehicles would enter the drive-thru lane from the west and then turn to the north along the east side of the restaurant.

Reference noise measurements were obtained at a distance of approximately 40 feet from the menu board containing the microphone/loudspeaker system at an angle of about 45° toward the rear of the vehicle being served. This provided a worst-case exposure to sound from the loudspeaker system since the vehicle was not located directly between the loudspeaker and measurement location. Cars were lined up in the access lane during the noise measurement period indicating that the drive-through lane was operating at or near a peak level of activity.



Each ordering cycle was observed to take approximately 60 seconds including vehicle movements. A typical ordering cycle included 5-10 seconds of loudspeaker use with typical maximum noise levels in the range of 60-62 dBA  $L_{max}$  at the 40 foot-reference location. Vehicles moving through the drive-thru lane produced noise levels in the range of 55-60 dBA  $L_{max}$  at the same distance. Vehicles parked at the ordering position (between the menu board and measurement site) were observed to provide significant acoustic shielding during the ordering sequence. The effects of such shielding are reflected by the noise measurement data. Noise levels were measured to approximately 60 dB  $L_{eq}$  at the measurement site, and included noise from all sources, including the loudspeaker, vehicle movements and HVAC equipment.

The closest noise-sensitive receptors (residential land uses) to the proposed retail drive-thru operations are located approximately 190 feet to the north. At this setback distance, noise levels associated with drive-thru retail operations would be expected to produce noise levels of approximately 47-49 dB  $L_{max}$  and approximately 46 dB  $L_{eq}$ . Potential project-related noise exposure at the locations of the closest residential land uses was calculated based upon the above-described reference noise measurement data, the existing sound walls, and the normal rate of sound attenuation over distance for a "point" noise source (6 dB/doubling of distance).

It is unknown if nighttime operations would occur at the drive-thru retail locations. The noise level of 46 dB  $L_{eq}$  at the closest residential property line assumes the drive-thru would be in constant operation and should therefore be considered a worst-case assessment of drive-thru noise levels. While drive-thru operational noise levels (46 dB  $L_{eq}$ ) slightly exceed the City's nighttime noise level standard of 45 dB  $L_{eq}$ , such levels are below existing (without project) nighttime ambient noise levels at the residential property lines and would therefore not be considered a significant impact. Therefore, potential impacts related to drive-thru noise would be less than significant, and no mitigation is required.

**Construction Noise Impacts.** Construction noise would occur at various locations within the project site through the buildout period and at locations where off-site infrastructure improvements may be required. Existing sensitive receptors could be located as close as 150 feet from construction activities. Table 4.O provides typical construction-related noise levels at distances of 100 feet, 200 feet, and 300 feet.

Construction noise is not considered to be a significant impact if construction is limited to the allowed hours and construction equipment is adequately maintained and muffled. The City of Hanford limits hours of construction to occur only between the hours of 7:00 a.m. to 8:00 p.m. Construction noise impacts could result in annoyance or sleep disruption for nearby residents if nighttime operations were to occur or if equipment is not properly muffled or maintained.

**Table 4.O: Typical Construction Equipment Maximum Noise Levels (dBA)**

| Type of Equipment   | 100 Feet | 200 Feet | 300 Feet |
|---------------------|----------|----------|----------|
| Concrete Saw        | 84       | 78       | 74       |
| Crane               | 75       | 69       | 65       |
| Excavator           | 75       | 69       | 65       |
| Front End Loader    | 73       | 67       | 63       |
| Jackhammer          | 83       | 77       | 73       |
| Paver               | 71       | 65       | 61       |
| Pneumatic Tools     | 79       | 73       | 69       |
| Dozer               | 76       | 70       | 66       |
| Rollers             | 74       | 68       | 64       |
| Trucks              | 82       | 72       | 70       |
| Pumps               | 74       | 68       | 64       |
| Scrapers            | 81       | 75       | 71       |
| Portable Generators | 74       | 68       | 64       |
| Backhoe             | 80       | 74       | 70       |
| Grader              | 80       | 74       | 70       |

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman (1987).

Noise levels associated with construction activities would be reduced by incorporating noise mitigation measures and appropriate best management practices. The following mitigation measures and best management practices should be applied during periods of project construction.

#### **Mitigation Measure NOI-2**

The project contractor shall implement the following measures during construction of the project:

- Per the City of Hanford Municipal Code, construction activities should not occur outside the hours of 7:00 a.m. to 8:00 p.m.
- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.
- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.
- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing the contact phone number of a designated noise disturbance coordinator.

Implementation of Mitigation Measure NOI-2 would limit construction hours and require the construction contractor to implement noise reducing measures during construction, which would reduce short-term construction noise impacts to a less-than-significant level.

**Noise Impacts to Proposed On-Site Sensitive Receptors.** The proposed project would include sensitive receptors (residential land uses, transient lodging, nursing homes, offices, etc.) that could be impacted by exterior and interior noise exposure associated with existing transportation noise sources (SR-198 and San Joaquin Valley Railroad line). The applicable exterior and interior noise level standards for such land uses are provided above as Table 4.K.

**Exterior Noise Exposure.** Exterior noise exposure within the project site is dominated by vehicle traffic associated with SR-198 to the south and railroad operations associated with the San Joaquin Valley Railroad line to the north. Noise levels measured at ambient noise monitoring sites LT-1 and LT-2 indicate that overall project site noise exposure is approximately 65-70 dB  $L_{dn}$ .

The exterior noise level standard applicable to the above-described sensitive receptors is 60 dB  $L_{dn}$ . The General Plan also states that where it is not possible to reduce noise in outdoor activity areas to 60 dB  $L_{dn}$ /CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB  $L_{dn}$ /CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance.

Exterior noise level compatibility standards for transportation noise sources are applied at the outdoor activity areas of sensitive receptors. Outdoor activity areas typically include backyards of single-family residential uses and outdoor common use areas (pools, BBQ/picnic areas, playgrounds, etc.) as well as individual patios, balconies and decks of multi-family residential uses and transient lodging land uses. The exact locations of such outdoor activity areas were not known at the time of this analysis; however, the project site plan (Figure 3) provides preliminary locations of pool areas for both the apartment development and the hotel development. Other proposed sensitive receptors (memory care facility, assisted living facility, skilled nursing facility, etc.) may also include outdoor activity areas, at which this exterior noise level standard would apply.

Based upon project site noise exposure (approximately 65-70 dB  $L_{dn}$ ) and the preliminary locations of the apartment and hotel pool areas (outdoor activity areas), mitigating exterior noise levels at these locations to at or below 60 dB  $L_{dn}$  would likely not be feasible. However, a preliminary analysis using a sound wall insertion loss model indicates that a sound wall constructed to a minimum height of 6.5 feet above ground level constructed around the two pool areas (apartment and hotel land uses) would mitigate exterior noise levels to below 65 dB  $L_{dn}$  within these outdoor activity areas.

Other proposed sensitive receptors (memory care facility, assisted living facility, skilled nursing facility, etc.) may also include outdoor activity areas, at which this exterior noise level standard would apply. The potential locations of outdoor activity areas associated with these land uses was not known at the time of this analysis. However, a similarly constructed sound wall around

such uses would reduce noise levels to below 65 dB  $L_{dn}$ . Such noise levels are allowed by the City.

Therefore, since transportation noise exposure levels are expected to exceed the City's 60 dB  $L_{dn}$  exterior noise level standard at outdoor activity areas associated with the multi-family apartment land use and the hotel land use, implementation of Mitigation Measure NOI-3 would be required.

**Mitigation Measure NOI-3**

**Exterior Noise Levels.** The final design shall include a minimum 6.5-foot above-ground level sound wall around outdoor activity areas associated with the proposed hotel and apartment land uses to mitigate exterior noise levels to below 65 dB  $L_{dn}$  within these outdoor activity areas.

**Interior Noise Exposure.** As described above, exterior project site noise exposure throughout the overall project area is approximately 65-70 dB  $L_{dn}$ , as a result of varying levels of proximity to both SR-198 and the San Joaquin Valley Railroad line. Additionally, peak hour exterior noise levels would be approximately 70 dB  $L_{eq}$  at the exterior of the office land uses to the north and the nursing college to the south. Interior noise level standards applicable to the project site vary, based upon proposed land uses. These interior noise level standards applicable to the project are:

- 45 dB  $L_{dn}$ : Multi-family apartment, hotel, skilled nursing facility, memory care facility, assisted living facility, and any additional facility where people are residing and sleep disturbance is considered.
- 45 dB  $L_{eq}$ : Office buildings, nursing college (as determined for a typical worst-case hour during periods of use).
- Based upon the above-described exterior noise exposure levels and applicable interior noise level standards, the proposed construction measures must be capable of providing approximately 25 dB of outdoor-to-indoor noise level reduction (NLR) ( $70-45=25$ ).

Generally speaking, construction measures complying with current building code standards would typically be expected to provide approximately 20-25 dB of outdoor-to-indoor NLR, provided windows and doors can remain closed for sound insulation purposes. However, additional sound attenuation measures may be required in conditions where the exterior façade consists of large portions of window or storefront glazing assemblies. Once construction plans are developed, an acoustical consultant should review to determine if additional interior noise level mitigation measures may be required.

**Mitigation Measure NOI-4**

**Interior Noise Levels.** Once building-specific construction plans become available, interior noise levels should be reviewed and calculated by a qualified acoustical consultant to determine if additional noise attenuation mitigation measures are required to comply with interior noise level standards.



Implementation of Mitigation Measures NOI-3 and NOI-4 would reduce exterior and interior noise levels at future sensitive receptors and would reduce potential impacts to a less-than-significant level.

*b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels?*

The dominant sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. None of these activities are anticipated to occur with construction or operation of the proposed project. Vibration from construction activities could be detected at the closest sensitive land uses, especially during movements by heavy equipment or loaded trucks and during some paving activities (if they were to occur).

Construction of the proposed project could result in the generation of groundborne vibration. This construction vibration impact analysis assesses the potential for building damages using vibration levels in peak particle velocity (PPV) (in/sec). Typical vibration levels at distances of 100 feet and 300 feet are summarized by Table 4.P. The closest existing sensitive receptors are located approximately 150 feet from construction activity. At this distance, vibration levels would not be expected to exceed any significant threshold levels for annoyance or damage. Therefore, construction-related vibration impacts would be less than significant, and no mitigation is required.

**Table 4.P: Typical Vibration Levels During Construction**

| Equipment         | PPV (in/sec) |          |
|-------------------|--------------|----------|
|                   | 100 feet     | 300 feet |
| Bulldozer (large) | 0.0110       | 0.00600  |
| Bulldozer (small) | 0.0004       | 0.00019  |
| Loaded Truck      | 0.0100       | 0.00500  |
| Jackhammer        | 0.0050       | 0.00200  |
| Vibratory Roller  | 0.0300       | 0.01300  |
| Caisson Drilling  | 0.0100       | 0.00600  |

Source: WJV Acoustics, Inc. (2021).

Once operational, it is not expected that ongoing operational activities would result in any vibration impacts at nearby sensitive uses. Activities involved in trash bin collection could result in minor on-site vibrations as the bin is placed back onto the ground. Such vibrations would not be expected to be felt at the closest off-site sensitive uses. As such, operational vibration impacts would be less than significant, and no mitigation is required.

*c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

The closest airport to the project site is the Hanford Municipal Airport, located approximately 1.5 miles southeast of the project site. Aircraft noise is occasionally audible at the project site; however,

no portion of the project site lies within the 60 dBA CNEL noise contours of any public airport. Therefore, the proposed project would not result in the exposure of people residing or working in the project area to excessive noise levels. This impact would be less than significant, and no mitigation is required.

#### 4.14 POPULATION AND HOUSING

|                                                                                                                                                                                                                     | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|-------------------------------------|
| Would the project:                                                                                                                                                                                                  |                                      |                                                             |                                     |                                     |
| a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?                                                                                     | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

- a. *Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

The proposed project would include medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, memory care, skilled nursing, and assisted living uses, and multi-family residential uses. The project site does not currently contain any permanent residents in the existing condition. As such, implementation of the proposed project would potentially result in an increase in residents of the City. The proposed project would result in the development of 90 multi-family residential apartment units, which would result in approximately 280 additional residents based on the estimated 3.11 persons per household<sup>35</sup> in Hanford. The skilled nursing, and assisted living uses are not a typical residential use and would likely attract existing residents that already live in the City and surrounding areas rather than inducing new population growth from outside the area. Nevertheless, this analysis assumes the facility would house one resident per unit. Therefore, these facilities would house 139 residents. Therefore, the proposed project would add up to 419 new residents on the project site. The addition of 419 new residents represents 0.7 percent of Hanford's 2021 population of 58,496.<sup>36</sup>

During project operation, the proposed project would also generate new employment. According to the most recently data published by the U.S. Census Bureau, the City of Hanford had approximately 58.8 percent of the population within the civilian labor force (approximately 34,396 individuals employed).<sup>37</sup> Therefore, because the region's existing labor force already includes a large number of people employed, it is reasonable to assume that the proposed project's employees would most likely be comprised of individuals who already live in the general area. As such, it is unlikely that these employment opportunities would cause employees to relocate their residences to be close to

<sup>35</sup> Kings County and Cities of Avenal, Corcoran, Hanford and Lemoore. 2016. *2016-2024 Housing Element*. January. Website: [https://cms6.revize.com/revize/hanfordca/document\\_center/Planning/Plans/Housing%20Element%20approved%20by%20HCD\\_2016-03-31%20final.pdf](https://cms6.revize.com/revize/hanfordca/document_center/Planning/Plans/Housing%20Element%20approved%20by%20HCD_2016-03-31%20final.pdf) (accessed March 2023).

<sup>36</sup> U.S. Census Bureau. 2022. QuickFacts Hanford City, California. Website: [census.gov/quickfacts/hanfordcitycalifornia](https://census.gov/quickfacts/hanfordcitycalifornia) (accessed March 2023).

<sup>37</sup> Ibid.

the project site, thereby inducing growth within the City. Population growth in the area as a result of on-site employment opportunities would be negligible.

All utilities infrastructure, including sewer and water facilities and storm drains, exists in the immediate vicinity of the project site and would be extended to the project site. These existing utility and service systems have adequate capacity to serve the proposed project (refer to Section 4.19, below). Therefore, the proposed project would not result in significant population growth as a result of project implementation. Impacts would be less than significant.

*b. Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?*

No housing is currently present on the project site, and therefore, there are no people living on the project site that would be displaced by the proposed project. Conversely, the project would result in the development of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled and nursing and assisted living uses, and multi-family residential uses. Therefore, there would be no impacts related to the displacement of substantial numbers of people or housing units, and no mitigation is required.



## 4.15 PUBLIC SERVICES

|                                                                                                                                                                                                                                                                                                                                                                                                           | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                                                                                                                                                                                                                                                                                                        |                                      |                                                             |                                     |                          |
| a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: |                                      |                                                             |                                     |                          |
| i. Fire protection?                                                                                                                                                                                                                                                                                                                                                                                       | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| ii. Police protection?                                                                                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| iii. Schools?                                                                                                                                                                                                                                                                                                                                                                                             | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| iv. Parks?                                                                                                                                                                                                                                                                                                                                                                                                | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| v. Other public facilities?                                                                                                                                                                                                                                                                                                                                                                               | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

- a. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*

i. *Fire protection?*

Fire suppression, emergency medical and rescue services, and other life safety services are provided to the project area and the site by the Fire Department. There are three fire stations within the City, with the closest to the project site being Fire Station 3 at 1070 S. 12th Street, Hanford, approximately 1.5 miles south of the project site.

As noted above, the proposed project would result in an incremental increase in the population of the City and therefore incrementally increase the demand for emergency fire services and emergency medical services. However, the proposed project would be required to comply with all applicable codes for fire safety and emergency access. In addition, the Fire Department would also review the site plans and fire access plan for the proposed project to ensure that adequate emergency access is provided prior to issuance of a building permit.

The Fire Department would provide services to the project site and would not require additional firefighters to serve the proposed project. The construction of a new or expanded fire station would also not be required. The proposed project would not result in a significant impact on the physical environment due to the incremental increase in demand for fire protection and life safety services, and the potential increase in demand for service is not expected to adversely affect existing response times to the site or within the City. In addition, the project applicant would be required to pay development impact fees for fire facilities, which are charged to all new development to support the needs for fire protection. Therefore, with payment of

development impact fees, construction and operation of the proposed project would have a less-than-significant impact on fire protection and safety services and facilities.

*ii. Police protection?*

The City of Hanford Police Department (Police Department) provides police protection to the project area and project site. The Police Department is located at 425 N. Irwin Street, approximately 1.4 miles northeast of the project site. Development of the proposed project would increase the population on the project site and incrementally increase demand for emergency police services to the project site. However, the Police Department would continue to provide service to the project site and would not require additional officers to serve the project site. The construction of new or expanded police facilities would not be required. In addition, the project applicant would be required to pay development impact fees for police facilities, which are charged to all new development to support the needs for police protection. Therefore, with payment of development impact fees, the proposed project would not result in a substantial adverse impact associated with the provision of additional police facilities or services, and impacts to police services represent a less-than-significant impact.

*iii. Schools?*

There are six elementary school districts and one high school district within Hanford, including Hanford Joint Union High School District, Hanford Elementary School District, Pioneer Union Elementary School District, Kings River-Hardwick Union Elementary School District, Kit Carson Union Elementary School District, Lakeside Union Elementary School District, and Armona Union Elementary School District. There are also private schools that provide educational services.

The estimated number of students the proposed project would generate is derived by multiplying the number of students per dwelling unit (the student yield factor) by the number of dwelling units in the proposed project (90 new units). The California State Allocation Board Office of Public-School Instruction reports that the Statewide student yield factor of 0.7 student per dwelling unit is applicable for unified school districts. Applying the Statewide average student yield factor, the proposed project would generate 63 students.

Senate Bill 50 (SB 50), which revised the existing limitation on developer fees for school facilities, was enacted as urgency legislation which became effective on November 4, 1998, as a result of the California voters approving a bond measure (Proposition 1A). SB 50 established a 1998 base amount of allowable developer fees (Level One fee) for residential construction (subject to adjustment) and prohibits school districts, cities, and counties from imposing school impact mitigation fees or other requirements in excess or in addition to those provided in the statute.

The project sponsor would be required to pay Hanford Joint Union High School District school impact fees prior to issuance of a certificate of occupancy. The Hanford Joint Union High School District is responsible for implementing the specific methods for mitigating school impacts under the Government Code. These fees would be directed towards maintaining adequate service levels, which would ensure that any impact to schools that could result from the proposed

project would be offset by development fees, and in effect, reduce potential impacts to a less-than-significant level.

*iv. Parks?*

Development of the proposed project could increase the use of parks within the vicinity of the project site. However, this increase in use is not expected to adversely affect the physical conditions of local and regional open space areas or recreational facilities or require the provision of new parks or facilities. Specifically, the proposed project is anticipated to increase the City population by less than one percent. The proposed project would not result in a substantial increase in demand for park or recreation services in the vicinity, such that new facilities would be required to serve the project. In addition, the project applicant would be required to pay development impact fees for parks and recreation facilities. Therefore, with payment of development impact fees, the proposed project would have a less-than-significant impact related to the provision of park and recreational facilities.

*v. Other public facilities?*

Development of the proposed project could also increase demand for other public services, including libraries, community centers, and public health care facilities. However, due to the minimal increase in population, the proposed project would not result in a substantial increase the use of these facilities, such that new facilities would be needed to maintain service standards, as these facilities are not currently overused and have capacity to serve new demand. In addition, the project applicant would be required to pay development impact fees, which would ensure that impacts to other public facilities would be less than significant.

**4.16 RECREATION**

|                                                                                                                                                                                                                | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?                        | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

*a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*

As discussed in Section 4.15, Public Services, residents of the proposed project would be expected to use local parks and community facilities within the City as well as regional recreational facilities. Although the proposed project would incrementally increase use of these facilities, this minor increase in use is not expected to result in substantial physical deterioration of local parks, trails, and community centers and this impact would be less than significant. Specifically, the proposed project is anticipated to increase the City's population by less than one percent and these facilities are anticipated to have capacity to serve this minimal increase in demand. In addition, the project applicant would be required to pay development impact fees for parks and recreation facilities. Therefore, with payment of development impact fees, the proposed project would have a less-than-significant impact on existing parks or other recreational facilities.

*b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*

The proposed project would involve development of the project site with residential uses. The proposed project does not include or require the construction or expansion of existing public recreational facilities. Therefore, development of the proposed project and associated recreational opportunities for use by project residents would not result in additional environmental effects beyond those described in this document, and no impact would occur.



## 4.17 TRANSPORTATION

|                                                                                                                                                                  | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                                                               |                                      |                                                             |                                     |                          |
| a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?          | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b. Conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)?                                                                                   | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d. Result in inadequate emergency access?                                                                                                                        | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### *a. Would the project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?*

This section is based on the Traffic Impact Study (TIS) prepared for the proposed project.<sup>38</sup> The TIS is included as Appendix F.

When preparing a TIS, guidelines set by affected agencies are followed. In analyzing street and intersection capacities the LOS methodologies are applied. LOS standards are applied by transportation agencies to quantitatively assess a street and highway system's performance. In addition, safety concerns are analyzed to determine the need for appropriate mitigation resulting from increased traffic near sensitive uses, the need for dedicated ingress and egress access lanes to the project, and other evaluations such as the need for signalized intersections or other improvements. Guidelines incorporated in the Highway Capacity Manual (HCM), 6th Edition, published in 2016 were also used in the development of this TIS. The study area for the TIS included the following study intersections and roadway segments.

### Intersections

- 12th Avenue/Glendale Avenue
- 12th Avenue/SR-198 westbound (WB) Ramps
- 12th Avenue/SR-198 eastbound (EB) Ramps
- Campus Drive/Lacey Boulevard
- Campus Drive/7th Street
- Campus Drive/6th Street
- 11th Avenue/Lacey Boulevard
- 11th Avenue /7th Street
- 11th Avenue/6th Street
- 11th Avenue/5th Street
- 11th Avenue/4th Street-SR-198 WB On Ramp
- 11th Avenue/3rd Street-SR-198 EB Off Ramp

<sup>38</sup> VRPA Technologies, Inc. 2020. *Draft Hanford Place Development Traffic Impact Study*. December.

## Segments

1. Lacey Boulevard
  - 12th Avenue to Campus Drive
  - Campus Drive to 11th Avenue
  - 7th Street
  - Campus Drive to 11th Avenue
2. 6th Street
  - Campus Drive to 11th Avenue
3. Glendale Avenue
  - East of 12th Avenue
4. 5th Avenue
  - West of 11th Avenue
5. Campus Drive
  - Lacey Boulevard to Glendale Avenue

The TIS includes the LOS analysis for the following traffic scenarios:

- Existing Conditions
- Existing Plus Project
- Near-Term Plus Project
- Cumulative Year 2042 Without Project
- Cumulative Year 2042 Plus Project

**Existing Traffic Counts and Roadway Geometrics.** The first step toward assessing project traffic impacts is to assess existing traffic conditions. Existing traffic counts were estimated considering the Kings County Association of Governments (KCAG) travel model and historic traffic counts in the study area given the COVID-19 pandemic. The methodology used for the development of existing traffic counts included the following:

- A comparison of the KCAG base year and future year travel model showed that the growth in the study area is approximately 2 percent per year. The 2 percent per year growth rate was applied to historical average daily trip (ADT) counts collected in the study area to estimate Year 2020 pre-COVID conditions.
- The estimated pre-COVID year 2020 ADT values (obtained using the 2 percent per year growth rate) were compared to October 2020 ADT values. Results of the comparison indicated that traffic counts taken in October 2020 ADT (i.e., during COVID) should be increased by a factor of 1.30 to estimate 2020 pre-COVID levels.
- Where intersection turning movement counts in years prior to 2020 are available, a 2 percent per year growth rate was applied to estimate year 2020 conditions.
- Where intersection turning movement counts are not available in years prior to 2020, a factor of 1.3 was applied to the October 2020 turning movement counts collected in the study area.

**City of Hanford Level of Service Policies.** The City of Hanford adopts minimum levels of service to control congestion that may result as new development occurs.

The City of Hanford General Plan Circulation Element states: “The City of Hanford has adopted an overall LOS standard of C with peak hour LOS standard of D acceptable in some instances. Due to the nature of the roadway system, improvements to existing developed areas are extremely difficult. As a result, there may be instances where a lower LOS is acceptable.”

The City of Hanford General Plan Objective CI 2 states: “Provide timely and effective means of programming and constructing street and highway improvements to maintain an overall Level of Service of “C”, with a peak hour Level of Service of “D” as defined in the HCM (published by the Transportation Research Board of the National Research Council) or better unless the City’s design considerations or other public health, safety, or welfare factors determine otherwise.”

The City of Hanford General Plan Policy CI 2.2 states: “Street improvements shall be prioritized with emphasis on current and forecasted service levels. Roadways experiencing or forecasted to experience conditions less than Level-of-Service “D” shall require improvements, unless the City’s design considerations or other public health, safety or welfare factors determine otherwise.”

**Caltrans Level of Service Policies.** With the changes brought about by SB 743 (described further in 4.17.1.b below), Caltrans no longer uses LOS to determine the need for transportation improvements. Instead, the focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020, and the Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance was used in determining the need for roadway improvements on Caltrans facilities.

**Project Trip Generation.** To assess potential impacts that the project may have on the surrounding roadway network, the first step was to determine project trip generation. Project trip generation is identified in Table 4.Q based on trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition) and the ITE Trip Generation Handbook (3rd Edition).

As discussed in Chapter 3.0, Project Description, 41,500 square feet of medical/commercial uses is currently proposed. However, the TIS evaluated 114,000 square feet of medical/commercial uses. As such, the proposed project would generate fewer trips than analyzed in the TIS/proposed project trip generation estimate. Thus, this analysis evaluates a project with higher trip generation potential. Therefore, this analysis can be considered conservative.

**Intersection Capacity Analysis.** Intersection LOS analysis was conducted using the Synchro software program. Synchro supports HCM methodologies and is deemed an acceptable program by City of Hanford staff for assessment of traffic impacts. LOS can be determined for both signalized and unsignalized intersections. Table 4.R indicates the ranges in the amounts of average delay for a vehicle at signalized and unsignalized intersections for the various levels of service ranging from LOS “A” to “F”.

**Table 4.Q: Project Trip Generation**

| Land Use                                   | Average Daily Trips | Weekday AM Peak Hour |            |            | Weekday PM Peak Hour |            |            |
|--------------------------------------------|---------------------|----------------------|------------|------------|----------------------|------------|------------|
|                                            |                     | In                   | Out        | Total      | In                   | Out        | Total      |
| Ambulatory Surgery Center                  | 148                 | 46                   | 13         | 59         | 9                    | 21         | 30         |
| Specialty Clinic                           | 475                 | 36                   | 10         | 46         | 13                   | 31         | 44         |
| Medical Office Building                    | 869                 | 51                   | 14         | 65         | 24                   | 62         | 86         |
| Psychiatric Health Facility                | 56                  | 12                   | 10         | 22         | 10                   | 12         | 22         |
| Hotel & Conference Center                  | 758                 | 28                   | 19         | 47         | 27                   | 26         | 53         |
| Nursing College                            | 709                 | 55                   | 17         | 72         | 32                   | 33         | 65         |
| Skilled Nursing Facility                   | 363                 | 23                   | 7          | 30         | 13                   | 19         | 32         |
| Memory Care                                | 229                 | 15                   | 4          | 19         | 9                    | 12         | 21         |
| Assisted Living Facility                   | 144                 | 10                   | 3          | 13         | 5                    | 12         | 17         |
| Multi-Family Apartment                     | 640                 | 10                   | 33         | 43         | 34                   | 20         | 54         |
| Medical/ Commercial                        | 3,934               | 234                  | 66         | 300        | 112                  | 288        | 400        |
| <b>Subtotal Trip Generation</b>            | <b>8,325</b>        | <b>520</b>           | <b>196</b> | <b>716</b> | <b>288</b>           | <b>536</b> | <b>824</b> |
| <b>Internal Vehicle Trips (10 percent)</b> | <b>833</b>          | <b>52</b>            | <b>20</b>  | <b>72</b>  | <b>29</b>            | <b>54</b>  | <b>82</b>  |
| <b>Total External Trip Generation</b>      | <b>7,493</b>        | <b>468</b>           | <b>176</b> | <b>644</b> | <b>259</b>           | <b>482</b> | <b>742</b> |

Source: VRPA Technologies, Inc. (2020).

**Table 4.R: Relationship of Delay to Level of Service**

| Level of Service | Signalized Intersections Average Total Delay (seconds/vehicle) | Unsignalized Intersections Average Total Delay (seconds/vehicle) |
|------------------|----------------------------------------------------------------|------------------------------------------------------------------|
| A                | ≤10.0                                                          | 0.0-10.0                                                         |
| B                | >10.0-20.0                                                     | >10.0-15.0                                                       |
| C                | >20.0-35.0                                                     | >15.0-25.0                                                       |
| D                | >35.0-55.0                                                     | >25.0-35.0                                                       |
| E                | >55.0-80.0                                                     | >35.0-50.0                                                       |
| F                | >80.0                                                          | >50.0                                                            |

Source: *Highway Capacity Manual*, 6<sup>th</sup> Edition (Transportation Research Board 2016).

When an unsignalized intersection does not meet acceptable LOS standards, the investigation of the need for a traffic signal shall be evaluated. The latest edition of the California Manual on Uniform Traffic Control Devices for Streets and Highways (California MUTCD) introduces standards for determining the need for traffic signals. The California MUTCD indicates that the satisfaction of one or more traffic signal warrants does not in itself require the installation of a traffic signal. In addition to the warrant analysis, an engineering study of the current or expected traffic conditions should be conducted to determine whether the installation of a traffic signal is justified. The California MUTCD Peak Hour Warrant (Warrant 3) was used to determine if a traffic signal is warranted at unsignalized intersections that fall below current LOS standards.

Table 4.S shows the intersection LOS for the existing conditions. Results of the analysis show that the 12th Avenue at Glendale Avenue intersection currently exceeds the City of Hanford's minimum LOS criteria during the PM peak hour. Table 4.S also provides the intersection LOS analysis for the study intersections for Existing Plus Project Scenario, Near-Term Traffic Conditions, and Cumulative Year 2042 Plus Project Traffic Conditions.



**Table 4.S: Intersection Operations**

| Intersection                                                 | Peak Hour | Existing Without Project |     | Existing Plus Project |     | Near-Term Plus Project |     | Cumulative Year 2042 Without Project |     | Cumulative Year 2042 Plus Project |     |
|--------------------------------------------------------------|-----------|--------------------------|-----|-----------------------|-----|------------------------|-----|--------------------------------------|-----|-----------------------------------|-----|
|                                                              |           | Delay                    | LOS | Delay                 | LOS | Delay                  | LOS | Delay                                | LOS | Delay                             | LOS |
| 1. 12th Avenue / Glendale Avenue <sup>1</sup>                | AM        | 22.7                     | C   | 30.2                  | D   | <b>37.2</b>            | E   | <b>74.4</b>                          | F   | <b>154.4</b>                      | F + |
|                                                              | PM        | <b>100.4</b>             | F+  | <b>184.6</b>          | F + | <b>269.9</b>           | F + | ++                                   | F   | ++                                | F + |
| 2. 12th Avenue / SR-198 WB Ramps <sup>2</sup>                | AM        | 13.8                     | B   | 13.7                  | B   | 14.5                   | B   | 18.8                                 | B   | 19.9                              | B   |
|                                                              | PM        | 17.8                     | B   | 19.4                  | B   | 23.0                   | C   | 64.5                                 | E   | 75.1                              | E   |
| 3. 12th Avenue / SR-198 EB Ramps <sup>2</sup>                | AM        | 11.9                     | B   | 12.5                  | B   | 12.7                   | B   | 13.2                                 | B   | 13.7                              | B   |
|                                                              | PM        | 13.0                     | B   | 13.6                  | B   | 14.3                   | B   | 19.0                                 | B   | 20.1                              | C   |
| 4. Campus Drive / Lacey Boulevard <sup>2</sup>               | AM        | 25.0                     | C   | 25.2                  | C   | 25.4                   | C   | 25.7                                 | C   | 25.5                              | C   |
|                                                              | PM        | 28.0                     | C   | 29.2                  | C   | 31.4                   | C   | 52.2                                 | D   | 52.9                              | D   |
| 5. Campus Drive / 7th Street <sup>3</sup>                    | AM        | 9.9                      | A   | 11.9                  | B   | 12.6                   | B   | 12.1                                 | B   | 15.0                              | B   |
|                                                              | PM        | 15.6                     | C   | 23.7                  | C   | 31.8                   | D   | <b>92.9</b>                          | F   | <b>146.9</b>                      | F   |
| 6. Campus Drive / 6th Street <sup>1</sup>                    | AM        | 10.4                     | B   | 13.3                  | B   | 13.6                   | B   | 10.7                                 | B   | 13.1                              | B   |
|                                                              | PM        | 10.6                     | B   | 13.9                  | B   | 14.3                   | B   | 11.5                                 | B   | 14.7                              | B   |
| 7. 11th Avenue / Lacey Boulevard <sup>2</sup>                | AM        | 20.4                     | C   | 20.3                  | C   | 21.0                   | C   | 25.3                                 | C   | 25.9                              | C   |
|                                                              | PM        | 27.5                     | C   | 28.5                  | C   | 31.6                   | C   | 49.9                                 | D   | 52.7                              | D   |
| 8. 11th Avenue / 7th Street <sup>2</sup>                     | AM        | 18.9                     | C   | 18.9                  | B   | 19.7                   | B   | 24.2                                 | C   | 24.4                              | C   |
|                                                              | PM        | 28.8                     | C   | 29.0                  | C   | 31.8                   | C   | <b>55.6</b>                          | E   | <b>57.6</b>                       | E   |
| 9. 11th Avenue / 6th Street <sup>1</sup>                     | AM        | 12.6                     | B   | 12.7                  | B   | 13.3                   | B   | 17.1                                 | C   | 17.3                              | C   |
|                                                              | PM        | 17.4                     | C   | 18.1                  | C   | 20.6                   | C   | <b>74.3</b>                          | F   | <b>83.6</b>                       | F   |
| 10. 11th Avenue / 5th Street <sup>2</sup>                    | AM        | 4.9                      | A   | 9.6                   | A   | 9.7                    | A   | 6.5                                  | A   | 10.7                              | B   |
|                                                              | PM        | 121                      | B   | 18.1                  | B   | 19.5                   | B   | 23.8                                 | C   | 42.3                              | D   |
| 11. 11th Avenue / 4th Street-SR-98 WB On Ramp <sup>2</sup>   | AM        | 10.0                     | B   | 15.3                  | B   | 15.9                   | B   | 16.4                                 | B   | 20.8                              | C   |
|                                                              | PM        | 12.7                     | B   | 14.6                  | B   | 15.6                   | B   | 21.0                                 | C   | 28.4                              | C   |
| 12. 11th Avenue / 3rd Street-SR 198-EB Off Ramp <sup>2</sup> | AM        | 18.6                     | B   | 21.0                  | C   | 22.9                   | C   | 27.0                                 | C   | 30.2                              | C   |
|                                                              | PM        | 25.1                     | C   | 30.6                  | C   | 35.4                   | D   | 76.3                                 | E   | 97.4                              | F   |

Source: VRPA Technologies, Inc. (2020).

Notes:

**Bold** denotes LOS standard has been exceeded.

+ Meets peak hour signal warrants.

++ Delay Exceeds 300 seconds.

<sup>1</sup> Two-way stop sign

<sup>2</sup> Signalized

<sup>3</sup> All-way stop sign

Results of the analysis show that the proposed project contribute to an unacceptable LOS at five of the study intersections when comparing the Cumulative Year 2042 scenarios. Potential intersection improvements are discussed below.

**12th Avenue at Glendale Avenue.** Installation of a traffic signal would alleviate LOS deficiencies at the intersection for all study scenarios. However, providing a traffic signal at this location is not practical given the close spacing of adjacent intersections. In lieu of the traffic signal, dual right turn lanes for the eastbound and westbound approaches to the intersection should be considered to alleviate queuing at the eastbound and westbound approaches.

**Campus Drive at 7th Street.** Installation of a traffic signal at Campus Drive at 7th Street would improve the intersection to meet the City of Hanford's acceptable LOS standard of 'D' for the Cumulative Year 2042 Plus Project scenario.

**11th Avenue at 7th Street.** Providing additional turning movement lanes along 11th Avenue and 7th Street is not possible due to design constraints or infeasible/impractical due to the presence of commercial development that currently exists along the north and south side of 7th Street.

**11th Avenue at 6th Street.** This intersection is forecasted to operate at unacceptable LOS 'F' during the PM peak hour under Cumulative Year 2042 Without Project and Cumulative Year 2042 Plus Project conditions; however, this intersection does not meet the peak hour traffic signal warrant because the minor approaches do not carry enough traffic to justify signalization. Therefore, no improvements are recommended for the project's contribution of traffic at the intersection for the Cumulative Year 2042 Plus Project condition.

**12th Avenue at SR-198 WB Ramps.** Providing additional turning movement lanes at the 12th Avenue and SR -98 WB Ramps intersection is not possible due to design constraints or infeasible/impractical due to the presence of development that currently exists along the north side of the SR-198 WB Ramps. As noted above, Caltrans no longer uses LOS to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes.

**Campus Drive at 7th Street.** Providing additional turning movement lanes at the 11th Avenue and 3rd Street-SR-198 EB Off Ramp intersection is not possible due to design constraints or infeasible/impractical due to the presence of development that currently exists along the south side of 3rd Street and the SR-198 EB Off Ramp. As above, Caltrans no longer uses LOS to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes.

Intersection operations with these potential improvements is shown in Table 4.T below. As shown in Table 4.T, the intersection of 12th Avenue at Glendale Avenue would be above the City's standard of LOS D standard; however, the City acknowledges in General Plan Objective CI 2 and Policy CI 2.2, that there may be instances where design considerations or other public health, safety, or welfare factors determine otherwise. Therefore, since additional improvements are not recommended due design considerations, impacts to intersection LOS would be less than significant. No mitigation is required.

**Roadway Segment Analysis.** According to the HCM, LOS is categorized by two parameters of traffic: uninterrupted and interrupted flow. Uninterrupted flow facilities do not have fixed elements such as traffic signals that cause interruptions in traffic flow. Interrupted flow facilities do have fixed elements that cause an interruption in the flow of traffic, such as stop signs and signalized intersections along arterial roads. A roadway segment is defined as a stretch of roadway generally located between signalized or controlled intersections.

**Table 4.T: Intersection Operations with Improvements**

| Intersection                                    | Peak Hour | Existing Plus Project |                      | Near-Term Plus Project |                      | Cumulative Year 2042 Plus Project |                      |
|-------------------------------------------------|-----------|-----------------------|----------------------|------------------------|----------------------|-----------------------------------|----------------------|
|                                                 |           | Delay                 | LOS                  | Delay                  | LOS                  | Delay                             | LOS                  |
| 1. 12th Avenue / Glendale Avenue                | AM        | <b>30.2</b>           | <b>D</b>             | <b>37.2</b>            | <b>E<sup>1</sup></b> | <b>154.4</b>                      | <b>F<sup>1</sup></b> |
|                                                 | PM        | <b>184.6</b>          | <b>F<sup>1</sup></b> | <b>269.9</b>           | <b>F<sup>1</sup></b> | <b>++</b>                         | <b>F<sup>1</sup></b> |
| 2. 12th Avenue / SR-198 WB Ramps                | AM        | -                     | -                    | -                      | -                    | 19.9                              | B                    |
|                                                 | PM        | -                     | -                    | -                      | -                    | 75.1                              | E <sup>2</sup>       |
| 5. Campus Drive / 7th Street                    | AM        | -                     | -                    | -                      | -                    | 12.8                              | B                    |
|                                                 | PM        | -                     | -                    | -                      | -                    | 20.4                              | C                    |
| 8. 11th Avenue / 7th Street                     | AM        | -                     | -                    | -                      | -                    | 24.4                              | C                    |
|                                                 | PM        | -                     | -                    | -                      | -                    | 57.6                              | E <sup>2</sup>       |
| 9. 11th Avenue / 6th Street                     | AM        | -                     | -                    | -                      | -                    | 17.3                              | C                    |
|                                                 | PM        | -                     | -                    | -                      | -                    | 83.6                              | F <sup>3</sup>       |
| 12. 11th Avenue / 3rd Street-SR 198 EB Off Ramp | AM        | -                     | -                    | -                      | -                    | 30.2                              | C                    |
|                                                 | PM        | -                     | -                    | -                      | -                    | 97.4                              | F <sup>2</sup>       |

Source: Source: VRPA Technologies, Inc. (2020).

Notes:

**Bold** denotes LOS standard has been exceeded.

<sup>1</sup> Installation of a traffic signal would alleviate LOS deficiencies at the intersection. A traffic signal is not recommended given the close spacing of adjacent intersections.

<sup>2</sup> Improvements to the intersection aren't recommended given the presence of abutting commercial development at the intersection.

<sup>3</sup> Intersection does not meet the peak hour traffic signal warrant.

++ Delay exceeds 300 seconds.

Segment LOS is important in order to understand whether the capacity of a roadway can accommodate future traffic volumes. The performance criteria used for evaluating volumes and capacities on the road and highway system for this study were estimated using the Modified HCM-Based LOS Tables which are widely accepted throughout the central valley, including Kings County. The tables consider the capacity of individual road and highway segments based on numerous roadway variables (design speed, passing opportunities, signalized intersections per mile, number of lanes, saturation flow, etc.). These variables were identified and applied to reflect segment LOS conditions. Street segment capacity was determined using information shown in Table 4.U, which comes from the Modified Arterial Level of Service Tables included in Appendix A of the TIS.

**Table 4.U: Peak Hour Two-Way Volumes**

| Level of Service |           |     |       |       |       |
|------------------|-----------|-----|-------|-------|-------|
| Lanes            | Division  | B   | C     | D     | E     |
| 2                | Undivided | N/A | 324   | 1,125 | 1,521 |
| 2                | Divided   | N/A | 340   | 1,181 | 1,597 |
| 4                | Undivided | 77  | 2,083 | 2,763 | 2,890 |
| 4                | Divided   | 81  | 2,205 | 2,925 | 3,060 |
| 6                | Divided   | 135 | 3,339 | 4,401 | 4,617 |

Source: VRPA Technologies, Inc. (2020).

Results of the segment analysis along the existing street and highway system are reflected in Table 4.V. Table 4.V also shows the results of the analysis.

**Table 4.V: Segment Operations**

| Street Segment                     | Peak Hour | Existing |     | Existing Plus Project |     | Near-Term Plus Project |     | Cumulative Year 2042 Without Project |     | Cumulative Year 2042 Plus Project |     |
|------------------------------------|-----------|----------|-----|-----------------------|-----|------------------------|-----|--------------------------------------|-----|-----------------------------------|-----|
|                                    |           | Volume   | LOS | Volume                | LOS | Volume                 | LOS | Volume                               | LOS | Volume                            | LOS |
| Lacey Boulevard                    |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| 12th Avenue to Campus Drive        | AM        | 855      | C   | 919                   | C   | 990                    | C   | 1,322                                | C   | 1,386                             | C   |
|                                    | PM        | 1,693    | C   | 1,767                 | C   | 1,907                  | C   | 2,617                                | D   | 2,691                             | D   |
| Campus Drive to 11th Avenue        | AM        | 963      | C   | 1,027                 | C   | 1,107                  | C   | 1,489                                | C   | 1,553                             | C   |
|                                    | PM        | 1,873    | C   | 1,947                 | C   | 2,101                  | C   | 2,896                                | D   | 2,970                             | E   |
| 7th Street                         |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| Campus Drive to 11th Avenue        | AM        | 346      | D   | 378                   | D   | 407                    | D   | 535                                  | D   | 567                               | D   |
|                                    | PM        | 743      | D   | 780                   | D   | 841                    | D   | 1,149                                | E   | 1,186                             | E   |
| 6th Street                         |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| Campus Drive to 11th Avenue        | AM        | 127      | C   | 127                   | C   | 137                    | C   | 196                                  | C   | 196                               | C   |
|                                    | PM        | 142      | C   | 142                   | C   | 154                    | C   | 220                                  | C   | 220                               | C   |
| Glendale Avenue                    |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| East of 12th Avenue                | AM        | 130      | C   | 323                   | C   | 334                    | D   | 201                                  | C   | 394                               | D   |
|                                    | PM        | 163      | C   | 385                   | D   | 399                    | D   | 252                                  | C   | 474                               | D   |
| 5th Avenue                         |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| West of 11th Avenue                | AM        | 101      | C   | 359                   | D   | 367                    | D   | 156                                  | C   | 414                               | D   |
|                                    | PM        | 464      | D   | 760                   | D   | 799                    | D   | 717                                  | D   | 1,014                             | D   |
| Campus Drive                       |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| Lacey Boulevard to Glendale Avenue | AM        | 251      | C   | AM                    | 380 | D                      | 400 | D                                    | 388 | D                                 | 517 |
|                                    | PM        | 393      | D   | PM                    | 541 | D                      | 574 | D                                    | 608 | D                                 | 756 |

Source: VRPA Technologies, Inc. (2020).

Notes:

**Bold** denotes LOS standard has been exceeded.

As indicated in Table 4.V, two study roadway segments would exceed LOS standards in the Cumulative year 2042 scenarios. Potential roadway segments improvements are discussed below.

**Lacey Boulevard between Campus Drive and 11th Avenue.** Providing additional travel lanes along Lacey Boulevard is not possible due to design constraints or infeasible/impractical due to the presence of retail development that currently exists along the north and south side of Lacey Boulevard. In addition, accommodating additional travel lanes along Lacey Boulevard could result in the elimination of parking along Lacey Boulevard.

**7th Street between Campus Drive and 11th Avenue.** Restriping 7th Street between Campus Drive and 11th Avenue to provide two-way left turn lane with removal of parking as necessary would improve capacity on 7th Street Campus Drive and 11th. However, providing additional travel lanes along 7th Street is not possible due to right-of-way constraints.



Roadway operations with these potential improvements is shown in Table 4.W below. As shown in Table 4.W, Lacey Boulevard between Campus Drive and 11th Avenue and 7th Street between Campus Drive and 11th Avenue would be above the City's standard of LOS D standard; however, the City acknowledges in General Plan Objective CI 2 and Policy CI 2.2, that there may be instances where design considerations or other public health, safety, or welfare factors determine otherwise. Therefore, since additional improvements are not recommended due design considerations, impacts to roadway segment LOS would be less than significant. No mitigation is required.

**Table 4.W: Segment Operations with Improvements**

| Street Segment              | Peak Hour | Cumulative Year 2042 Plus Project |                |
|-----------------------------|-----------|-----------------------------------|----------------|
|                             |           | Volume                            | LOS            |
| Lacey Boulevard             |           |                                   |                |
| Campus Drive to 11th Avenue | AM        | 1,553                             | C              |
|                             | PM        | 2,970                             | E <sup>1</sup> |
| 7th Street                  |           |                                   |                |
| Campus Drive to 11th Avenue | AM        | 567                               | C              |
|                             | PM        | 1,186                             | E <sup>1</sup> |

Source: VRPA Technologies, Inc. (2020).

Notes:

**Bold** denotes LOS standard has been exceeded.

<sup>1</sup> Capacity increasing improvements to the roadway segment aren't recommended given the presence of abutting commercial development.

**b. Would the project conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)?**

On December 28, 2018, the California Office of Administrative Law cleared the revised *State CEQA Guidelines* for use. Among the changes to the guidelines was removal of vehicle delay and level of service from consideration under CEQA. With the adopted guidelines, transportation impacts are to be evaluated based on a project generated VMT.

The City has recently adopted its SB 743 guidelines – City of Hanford VMT Thresholds and Implementation Guidelines (guidelines), November 2022. Therefore, the project VMT analysis was conducted using the methodology and significant threshold criteria identified in the guidelines. As previously mentioned, the project includes residential, multiple medical uses, and commercial land uses. As per the guidelines, mixed-use projects should be evaluated separately for each component of the project using the applicable VMT metric. The VMT analysis is based on the Hanford Place Medical Mixed-use Development Project VMT Analysis Memorandum,<sup>39</sup> which is included as Appendix G.

The guidelines also provide screening criteria to screen out land use projects from a detailed VMT analysis. As per the guidelines, mixed-use projects should be evaluated separately for each component of the project using applicable VMT metrics. Based on the screening criteria, only the medical/commercial uses component of the project can be screened out of detailed VMT analysis

<sup>39</sup> LSA. 2023. *Hanford Place Medical Mixed-use Development Project Vehicle Miles Traveled (VMT) Analysis Memorandum*. March.

since the project would include less than 55,000 square feet of retail uses. However, the medical/commercial uses component was included in the project model run to appropriately account for the internal capture that will occur due to the mixed-use nature of the project. Given that the project land uses other than medical/commercial uses cannot be screened out, a detailed VMT analysis was conducted for these land uses.

For projects that require a detailed VMT analysis, the guidelines recommend use of KCAG travel demand model to conduct the VMT analysis. Therefore, the KCAG model was used for the VMT evaluation of the project. Numerical values for the regional thresholds (VMT per capita, VMT per employee, and VMT per service population) were obtained from the guidelines document – Table E: Significance Thresholds for VMT Analysis.

Table 4.X shows the result of the VMT analysis. As shown in Table 4.X, the project VMT per capita for residential component of the project is 39.9 percent lower than the regional threshold. Similarly, the project VMT per employee for the memory care, assisted living, and skilled nursing facility uses is 62.7 percent lower than the corresponding regional threshold. Also, the VMT per service population for rest of non-residential uses (except medical/commercial uses) is 43.6 percent lower than the regional threshold. As such, based on the project’s VMT analysis, the project would not have a significant VMT impact.

**Table 4.X: Project VMT Metrics and Regional Threshold Comparison**

|                            | Project | City of Hanford Threshold | Difference | Percent Difference |
|----------------------------|---------|---------------------------|------------|--------------------|
| VMT Per Capita             | 5.40    | 8.99                      | -3.59      | -39.9%             |
| VMT per Employee           | 6.32    | 16.95                     | -10.63     | -62.7%             |
| VMT per Service Population | 12.32   | 21.84                     | -9.52      | -43.6%             |

Source: Source: LSA (March 2023).

Note: The City of Hanford Threshold was obtained from the City of Hanford VMT Thresholds and Implementation Guidelines, Table E: Significance Thresholds for VMT Analysis (November 2022).

In summary, as described above the proposed project would not exceed the VMT regional average standards. As such the proposed project would not conflict with or be inconsistent with *State CEQA Guidelines* §15064.3, subdivision (b).

*c. Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

Vehicular access to the site would be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right of way. The proposed project would also construct a roundabout, which would also be dedicated as public right of way and would be constructed to Caltrans or City-approved standards. As part of the project, Glendale Avenue would be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle would be removed, and Glendale Avenue would be realigned using speed-specific design curves. Any new portions of Glendale Avenue would be dedicated as public right of way and any portion of existing right of way not used would be

abandoned. 5th Street would be extended starting at the existing alignment before realigning to the roundabout.

The proposed project would not include any sharp curves or other roadway design elements that would create dangerous conditions. In addition, the project design features would be required to comply with standards set by the City's General Plan and City Engineer. In addition, the proposed project would also be required to submit plans to the City Fire Department for review and approval prior to the issuance of building permits to ensure there are no substantial hazards associated with the project design. Therefore, the proposed project would result in a less-than-significant impact related to hazards associated with a design feature, and no mitigation is required.

*d. Would the project result in inadequate emergency access?*

Emergency access would be provided to the project site by Glendale Avenue, 5th Street, and Campus Drive. Further, the proposed project's site plan would be subject to review and approval by the City Fire Department to ensure the project includes adequate emergency access. In addition, as discussed in Response 4.9.f, project implementation would not physically interfere with emergency evacuation or the City Fire Department access to and from the project site. Therefore, the proposed project would result in less-than-significant impacts related to emergency access, and no mitigation is required.

#### 4.18 TRIBAL CULTURAL RESOURCES

|                                                                                                                                                                                                                                                                                                                                                                                                                          | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact | No<br>Impact             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|------------------------------------|--------------------------|
| Would the project:                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |                                                             |                                    |                          |
| a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:                                             |                                      |                                                             |                                    |                          |
| i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)? Or                                                                                                                                                                                                                           | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |
| ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |

- a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:*
- i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)? Or*
  - ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.*

AB 52, which became law on January 1, 2015, provides for consultation with California Native American tribes during the CEQA environmental review process, and equates significant impacts to “tribal cultural resources” with significant environmental impacts.

Public Resources Code (PRC) Section 21074 states that “tribal cultural resources” are:



Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe and are one of the following:

- Included or determined to be eligible for inclusion in the California Register of Historical Resources;
- Included in a local register of historical resources as defined in subdivision (k) of PRC Section 5020.1; or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

A “historical resource” (PRC Section 21084.1), a “unique archaeological resource” (PRC Section 21083.2(g)), or a “nonunique archaeological resource” (PRC Section 21083.2 (h)) may also be a tribal cultural resource if it is included or determined to be eligible for inclusion in the California Register. The consultation provisions of the law require that a public agency consult with local Native American tribes that have requested placement on that agency’s notification list for CEQA projects. Within 14 days of determining that a project application is complete, or a decision by a public agency to undertake a project, the lead agency must notify tribes of the opportunity to consult on the project, should a tribe have previously requested to be on the agency’s notification list. California Native American tribes must be recognized by the NAHC as traditionally and culturally affiliated with the project site and must have previously requested that the lead agency notify them of projects. Tribes have 30 days following notification of a project to request consultation with the lead agency.

The purpose of consultation is to inform the lead agency in its identification and determination of the significance of tribal cultural resources. If a project is determined to result in a significant impact on an identified tribal cultural resource, the consultation process must occur and conclude prior to adoption of a Negative Declaration or Mitigated Negative Declaration, or certification of an Environmental Impact Report (PRC Sections 21080.3.1, 21080.3.2, 21082.3).

California Native American tribes traditionally and culturally affiliated with the project site and area were notified of the proposed project on August 5, 2020. Follow-up contact by email and telephone was completed on August 13, 2020. No responses have been received to date.

The proposed excavation of the project sites could potentially result in adverse effects of unanticipated tribal cultural resources. Mitigation Measures CULT-1 through CULT-3 would address unknown archaeological materials and unknown human remains. In addition, in order to address the concerns of the Tachi Yokut Tribe, the City is requiring the implementation of a Burial Treatment Plan as a mitigation measure on all projects. Mitigation Measure CULT-4 would ensure implementation of a Burial Treatment Plan and would reduce impacts to a less than significant level. Therefore, implementation of Mitigation Measures CULT-1 through CULT-4, the proposed project would not have a significant impact on tribal cultural resources.

#### 4.19 UTILITIES AND SERVICE SYSTEMS

|                                                                                                                                                                                                                                                                                     | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| Would the project:                                                                                                                                                                                                                                                                  |                                      |                                                             |                                     |                          |
| a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>            | <input type="checkbox"/> |
| b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?                                                                                                                           | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?                                                   | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?                                                                                             | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?                                                                                                                                                                  | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

*a. Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?*

As identified in Section 2.0, Project Description, utilities required to serve the proposed project would include water, sanitary sewer, storm water drainage, electricity, natural gas, and telecommunications infrastructure. Water service, sewage disposal, and refuse collection would be provided by the City of Hanford. In addition, all City utilities (i.e., water, sewer, and storm drain) would be constructed within the proposed right of way. Storm drainage would be collected by an underground conveyance system and delivered to the onsite bio infiltration basin. The basin would be privately held by the owners and would collect both the proposed project and the City right of way. All storm drain facilities would be designed to City standards.

**Water.** The City of Hanford provides water service to the project site. Based on the City's 2020 Urban Water Management Plan (UWMP), the City currently uses local groundwater as the sole source of water supply and does not purchase or import water from any other water suppliers or entities. At the time of preparation of the 2020 UWMP, the City had recorded metered water deliveries to 17,965 accounts. The total amount of metered water delivered in 2020 was 11,714

acre-feet per year (afy). Based on the 2020 UWMP, the total project water demand for customers served by the City of Hanford will be 12,172 afy in 2030.<sup>40</sup>

Short term demand for water may occur during excavation, grading, and construction activities on site. Construction activities would require water primarily for dust mitigation purposes. Water from the existing potable water lines in the vicinity of the project site would be used. Overall, short-term construction activities would require minimal water and are not expected to have any adverse impacts on the existing water system or available water supplies. The proposed project would not require the construction of new or expanded water conveyance, treatment, or collection facilities with respect to construction activities. Therefore, the impacts on water facilities during construction would be less than significant, and no mitigation is required.

According to water demand factors included in CalEEMod, the proposed project is estimated to demand approximately 77,272 gallons per day (gpd) or 86.6 afy of water. Therefore, the estimated increase in water demand associated with the project would represent approximately 0.7 percent of the City's projected potable water demand of 12,172 afy in 2030. The project-generated increase in water demand would be minimal and would fall within the City's existing capacity and available supply. As such, the proposed project would not necessitate new or expanded water entitlements, and the City would be able to accommodate the increased demand for potable water.

**Wastewater.** The City collects wastewater from residential, commercial, and industrial customers within the City limits and some unincorporated areas. The collected flows are conveyed through a trunk system to a Wastewater Treatment Facility (WWTF) in the south of the City. The City's large industrial area near the southern boundary of the City limits collect flows at a series of lift stations before being pumped north to the WWTF. Based on available data received from City staff, the WWTF treated an average annual wastewater flow of approximately 4,944 afy in 2020.<sup>41</sup>

No significant increase in wastewater flows is anticipated as a result of construction activities on the project site. Sanitary services during construction would be provided by portable toilet facilities, which transport waste off-site for treatment and disposal. Therefore, during construction, potential impacts to wastewater treatment and wastewater conveyance infrastructure would be less than significant, and no mitigation would be required.

As discussed above, according to water demand factors included in CalEEMod, the proposed project is estimated to demand approximately 77,272 gpd or 86.6 afy of water. Wastewater generation associated with the proposed project is not anticipated to exceed the WWTF wastewater treatment requirements or exceed the available capacity to accommodate the increased wastewater flows from the proposed project. The project would be adequately served by the capacity and the existing wastewater conveyance system. As such, the proposed project would not necessitate new or

<sup>40</sup> Hanford, City of. 2021. *2020 Urban Water Management Plan*. October. Website: [http://cms6.revize.com/revize/hanfordca/document\\_center/Public%20Works/Water%20Management/2020%20UWMP,%20Final.pdf](http://cms6.revize.com/revize/hanfordca/document_center/Public%20Works/Water%20Management/2020%20UWMP,%20Final.pdf) (accessed March 2023).

<sup>41</sup> Ibid,

expanded water entitlements, and the City would be able to accommodate the increased demand for potable water.

**Stormwater and Drainage Facilities.** During construction activities, soil would be exposed and disturbed, drainage patterns would be temporarily altered during grading and other construction activities, and there would be an increased potential for soil erosion and siltation compared to existing conditions. Additionally, during a storm event, soil erosion and siltation could occur at an accelerated rate. As discussed above in Response 4.10.a, Mitigation Measure HYDRO-1 requires compliance with applicable permits and preparation of a SWPPP to identify construction BMPs to be implemented as part of the proposed project to reduce impacts to water quality during construction, including those impacts associated with soil erosion and siltation. Compliance with applicable permit requirements and implementation of the construction BMPs would ensure that the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental impacts, and the impact would be less than significant with implementation of Mitigation Measure HYDRO-1.

Once operational, implementation of the proposed project would result in new internal access roads and surface parking lots, increasing impervious surface area which is not prone to erosion or siltation. The project would also include landscaping that would minimize erosion and siltation. The project site would be designed for storm water to be captured by the storm drain system, which would be collected by an underground conveyance system and delivered to the onsite bio infiltration basin. The basin would be privately held by the owners and would collect both the proposed project and the City right of way. All storm drain facilities would be designed to City standards. The proposed project would also convert the Peoples Ditch to a 66-inch-diameter below-ground pipeline where the ditch currently exists. The depth of the below-ground pipeline would be between two and six feet. Storm drainage facilities would be constructed to City standards, which would ensure that sufficient capacity in the downstream drain systems is available to accommodate any increase in storm runoff from the project site so that on- and off-site flooding does not occur.

With the adherence to Mitigation Measure HYDRO-1, the proposed project would result in less than significant impacts related to the construction or expansion of stormwater drainage facilities. No additional mitigation is required.

**Electricity.** Electrical power would be supplied to the proposed project site by SCE. SCE provides services through a grid of transmission lines and related facilities. SCE provides electricity to more than 15 million people in a 50,000 sq mi area of Central, Coastal, and Southern California.<sup>42</sup> According to the CEC, total electricity consumption in the SCE service area in 2021 was 103,045 GWh.<sup>43</sup> Total electricity consumption in Kings County was 1,980 GWh or 1,980,705,673 kWh.<sup>44</sup>

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<sup>42</sup> Southern California Edison (SCE). 2020. About Us. Website: <https://www.sce.com/about-us/who-we-are> (accessed March 2023).

<sup>43</sup> California Energy Commission. 2022b. Energy Consumption Data Management Service. Electricity Consumption by County and Entity. Website: [www.ecdms.energy.ca.gov/elecbycounty.aspx](http://www.ecdms.energy.ca.gov/elecbycounty.aspx) (accessed March 2023).

<sup>44</sup> Ibid.



Short-term construction activities would be limited to providing power to the staging area and portable construction equipment and would not substantially increase demand for electricity. The heavy equipment used for construction is primarily powered by diesel fuel. Temporary electric power would be provided via existing utility boxes and lines on the project site. Given the limited nature of potential demand for electricity during construction and the availability of existing power lines on the site, there would not be a need to construct new or alter existing electric transmission facilities. Impacts to local regional supplies of electricity would be less than significant, and no mitigation is required.

The proposed project includes connections to the surrounding electrical system on site. Operation of the proposed project would increase on-site electricity demand. As discussed in Response 4.6.a, the estimated potential increased electricity demand associated with the proposed project is 5,345,159 kWh per year. Therefore, electricity demand associated with the proposed project would only be approximately 0.27 percent of Kings County's total electricity demand. Because the proposed project would only represent a small fraction of electricity demand in Kings County, the project would meet Title 24 requirements and incorporate additional energy conservation measures, and there would be sufficient electricity supplies available, energy demand for the proposed project would be less than significant. Therefore, although the proposed project would require the construction of new improvements related to the provision of electricity service, the proposed project would not result in significant environmental impacts and the proposed project's impacts would be less than significant. No mitigation is required.

**Natural Gas.** The Southern California Gas Company (SoCalGas) is the natural gas service provider for the project site. SoCalGas provides natural gas to approximately 21.8 million people in a 24,000-square-mile service area throughout Central and Southern California, from Visalia to the Mexican border.<sup>45</sup> According to the CEC, total natural gas consumption in the SoCalGas service area in 2021 was 6,755 million therms (2,308 million therms for the residential sector). Kings County consumed approximately 64 million therms or approximately 64,004,283 therms.<sup>46</sup>

Operation of the proposed project would increase on-site natural gas demand. As discussed in Response 4.6.a, the estimated potential increased natural gas demand associated with the proposed project is 116,068 therms per year. Therefore, natural gas demand associated with the proposed project would only be approximately 0.18 percent of Kings County's total natural gas demand. Because the proposed project would only represent a small fraction of electricity demand in Kings County, the project would meet Title 24 requirements and incorporate additional energy conservation measures, and there would be sufficient natural gas supplies available, energy demand for the proposed project would be less than significant. Therefore, although the proposed project would require the construction of new improvements related to the provision of natural gas service, the proposed project would not result in significant environmental impacts and the proposed project's impacts would be less than significant. No mitigation is required.

<sup>45</sup> Southern California Gas Company (SoCalGas). 2020. About SoCalGas. Website: <https://www3.socalgas.com/about-us/company-profile> (accessed March 2023).

<sup>46</sup> California Energy Commission. 2022c. Energy Consumption Data Management Service. Gas Consumption by County and Entity. Website: [www.ecdms.energy.ca.gov/gasbycounty.aspx](http://www.ecdms.energy.ca.gov/gasbycounty.aspx) (accessed March 2023).

**Telecommunication Facilities.** Existing telephone, cable, and internet service lines in the vicinity would serve the project site. Internal to the project site, the project Applicant/Developer would be responsible for constructing adequate telecommunication facility extensions for the proposed project. The reconfiguration of these facilities would occur on site during the site preparation and earthwork phase and are not expected to impact any telephone, cable, or internet services offsite that serve the surrounding areas. Additionally, telecommunication facilities are generally installed concurrently with utility expansions and impacts associated with the expansion of telecommunication facilities are already considered in the air quality, noise, and construction traffic analysis. Therefore, the project impacts associated with the relocation or construction of new or expanded telecommunication facilities and impacts would be less than significant. No mitigation is required.

**Summary.** The proposed project would not require or result in the relocation or construction of new or expanded facilities for water, wastewater treatment, storm drainage, electric power, natural gas, or telecommunications. With implementation of Mitigation Measure HYDRO-1 included in Section 4.10, Hydrology and Water Quality, the project would not substantially increase demand upon these facilities. Therefore, impacts to these utility facilities would be less than significant.

*b. Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*

Refer to discussion a) of Section 4.10, Hydrology and Water Quality. As discussed above, sufficient water supply would be available to serve the project site. As a result, the project would result in a less-than-significant impact related to water supply.

*c. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*

The proposed project is not expected to exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.

*d. Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?*

Solid waste and recycling pickup and disposal in the City of Hanford is provided by the Kings Waste Management Authority (KWMA). The KWMA does not operate an active landfill. Waste is hauled by transfer trucks from the Material Recover Facility (MRF) to the State permitted 320-acre Chemical Waste Management Landfill site in Kettleman Hills, approximately 45 miles west of the MRF. A combined MRF and Transfer Station (TS) was constructed near the old landfill southeast of Hanford. The MRF and TS facility includes a small but complete Household Hazardous Waste collection station.<sup>47</sup> Waste Management Kettleman Hills Landfill is permitted to receive a maximum of 2,000 tons of municipal solid waste per day, but typically receives an average of only about 1,350 tons per

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<sup>47</sup> Hanford, City of. 2017, op. cit.

day.<sup>48</sup> In addition, Waste Management Kettleman Hills Landfill is currently proposing a facility expansion to extend its hazardous waste operations and increase the capacity at the existing landfill.<sup>49</sup>

Based on the CalEEMod output, operation of the proposed project would generate approximately 5,896 pounds of solid waste per day or about 3 tons of solid waste per day. Given the available capacity at the landfill, the additional solid waste generated by the proposed project is not anticipated to cause the facility to exceed its daily permitted capacity. As such, the project would be served by a landfill with sufficient capacity to accommodate the project's waste disposal needs, and impacts associated with the disposition of solid waste would be less than significant.

*e. Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?*

The proposed project would comply with all federal, State, and local solid waste statutes and/or regulations related to solid waste. Also refer to Response 4.19.d. Therefore, the proposed project would result in a less-than-significant impact related to solid waste regulations.

<sup>48</sup> Waste Management, 2021. *Facility Overview*. Website: <https://kettlemanhillslandfill.wm.com/fact-sheets/2011/facility-overview.jsp> (accessed March 2023).

<sup>49</sup> Waste Management, 2019. *Facility Expansion*. Website: [kettlemanhillslandfill.wm.com/facility-expansion/index.jsp](https://kettlemanhillslandfill.wm.com/facility-expansion/index.jsp) (accessed March 2023).

**4.20 WILDFIRE**

|                                                                                                                                                                                                                                                                    | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact  | No<br>Impact             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|-------------------------------------|--------------------------|
| If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:                                                                                                                                   |                                      |                                                             |                                     |                          |
| a. Substantially impair an adopted emergency response plan or emergency evacuation plan?                                                                                                                                                                           | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?                                                        | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?                                                                            | <input type="checkbox"/>             | <input type="checkbox"/>                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

**a. Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?**

Wildland fires occur in geographic areas that contain the types and conditions of vegetation, topography, weather, and structure density susceptible to risks associated with uncontrolled fires that can be started by lightning, improperly managed campfires, cigarettes, sparks from automobiles, and other ignition sources. According to the California Department of Forestry and Fire Protection (CAL FIRE) Very High Fire Hazard Severity Zone (VHFHSZ) Map for Kings County, the project site is not located within a High or Very High Fire Hazard Severity Zone.

The proposed project consists of a mixed-use development on an infill site within the City. As a result, project implementation would not physically interfere with evacuation plans or the City Fire Department access to and from the project site. In addition, the proposed project's site plan would be subject to review and approval by the City Fire Department to ensure the project includes adequate emergency access. Moreover, since the project site is not located in or near a VHFHSZ nor is it located in or near a State Responsibility Area (SRA), potential impacts associated with emergency access described above would not pertain to wildfire and would more likely be associated with an urban fire or other emergency situations. Therefore, operation of the proposed project would not substantially impair an adopted emergency response plan or emergency evacuation plan. This impact would be less than significant and no mitigation would be required.



- b. Would the project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?*

As stated previously, the project site is not located in or near a VHFHSZ nor is it located in or near a SRA. Therefore, the proposed project would not exacerbate wildfire risks due to slope and prevailing winds, thereby exposing project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. This impact would be less and significant, and no mitigation would be required.

- c. Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?*

Utility and infrastructure improvements included as part of the project are described in Section 2.0, Project Description. These improvements would include the installation of water, sanitary sewer, storm water drainage, electricity, natural gas, and telecommunications infrastructure. The project would also include new internal roads and would realign Glendale Avenue at the northwest corner of the Hanford Veterinary Hospital development.

The project site is not located in or near a VHFHSZ nor is it located in or near a SRA. Utility installations and internal roads would not exacerbate fire risk due to the location of the project site in an urban area outside of a designated fire hazard zone. Therefore, the proposed project would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that would exacerbate fire risk or result in temporary or ongoing impacts to the environment. This impact would be less and significant, and no mitigation would be required.

- d. Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?*

Landslides and other forms of mass wasting, including mud flows, debris flows, and soil slips, occur as soil moves downslope under the influence of gravity. Landslides are frequently triggered by intense rainfall or seismic shaking but can also occur as a result of erosion and downslope runoff caused by rain following a fire. As previously discussed in Response 4.7.a, Hanford is located in a stable geologic formation, so the effects of ground shaking on soil stability should be minimal. In addition, the project site is generally level and would not expose people or structures to potential substantial adverse effects associated with landslides. Further, as stated previously, the project site is not located in or near a VHFHSZ nor is it located in or near a SRA. Therefore, the proposed project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. This impact would be less than significant, and no mitigation would be required.

#### 4.21 MANDATORY FINDINGS OF SIGNIFICANCE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Potentially<br>Significant<br>Impact | Less Than<br>Significant with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact | No<br>Impact             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------|------------------------------------|--------------------------|
| a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |
| b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)                                                                                                                                       | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |
| c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?                                                                                                                                                                                                                                                                                                                                          | <input type="checkbox"/>             | <input checked="" type="checkbox"/>                         | <input type="checkbox"/>           | <input type="checkbox"/> |

- a. *Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?*

Implementation of Mitigation Measures CULT-1, CULT-2, CULT-3, CULT-4, and GEO-2 would ensure that potential impacts to historic, archaeological, tribal and paleontological resources that could be uncovered during construction activities would be reduced to a less-than-significant level. Implementation of Mitigation Measures BIO-1 through BIO-5 would ensure that potential impacts to special-status species and modifications to Peoples Ditch would be reduced to a less-than-significant level. Therefore, with the incorporation of mitigation measures, development of the proposed project would not: (1) degrade the quality of the environment; (2) substantially reduce the habitat of a fish or wildlife species; (3) cause a fish or wildlife species population to drop below self-sustaining levels; (4) threaten to eliminate a plant or animal community; (5) reduce the number or restrict the range of a rare or endangered plant or animal; or (6) eliminate important examples of the major periods of California history.

- b. *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

The proposed project's impacts would be individually limited and not cumulatively considerable. The potentially significant impacts that can be reduced to a less-than-significant level with implementation

of recommended mitigation measures include the topics of biological resources, cultural resources, geology and soils, hydrology and water quality, and noise. For the topic of biological resources, implementation of Mitigation Measures BIO-1 through BIO-5 would ensure that impacts related to special status-species and modification of the Peoples Ditch are reduced to a less-than-significant level. For the topic of cultural resources, potentially significant impacts to archaeological resources would be reduced to less-than-significant levels with implementation of Mitigation Measures CULT-1 and CULT-2 and Mitigation Measures CULT-3 and CULT-4 would reduce potential impacts to human remains to a less than significant level. For the topic of geology and soils, potentially significant impacts related to soil erosion during construction would be reduced to less-than-significant levels with implementation of Mitigation Measure GEO-1 and potentially significant impacts related to paleontological resources would be reduced to less-than-significant levels with implementation of Mitigation Measure GEO-2. For the topic of hydrology and water quality, implementation of Mitigation Measures HYDRO-1 and HYDRO-2 would ensure that potential water quality impacts are reduced to a less-than-significant level. For the topic of noise, impacts would be reduced to a less-than-significant level with implementation of Mitigation Measures NOI-1 through NOI-4.

For the topics of aesthetics, air quality, agricultural and forestry resources, energy, greenhouse gas emissions, hazards and hazardous materials, land use and planning, mineral resources, population and housing, public services, recreation, transportation, tribal cultural resources, utilities and service systems, and wildfire, the project would have no impacts or less-than-significant impacts, and therefore, the project would not substantially contribute to any potential cumulative impacts for these topics. All environmental impacts that could occur as a result of the proposed project would be reduced to a less-than-significant level through the implementation of the mitigation measures recommended in this document.

Implementation of these measures would ensure that the impacts of the project would be below established thresholds of significance and that these impacts would not combine with the impacts of other cumulative projects to result in a cumulatively considerable impact on the environment as a result of project development. Therefore, this impact would be less than significant.

*c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

The proposed project would not result in any environmental effects that would cause substantial direct or indirect adverse effects to human beings.

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## APPENDIX A

### CALEEMOD OUTPUTS



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# Hanford Place Project Custom Report

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# 1. Basic Project Information

## 1.1. Basic Project Information

| Data Field                  | Value                                  |
|-----------------------------|----------------------------------------|
| Project Name                | Hanford Place Project                  |
| Lead Agency                 | —                                      |
| Land Use Scale              | Project/site                           |
| Analysis Level for Defaults | County                                 |
| Windspeed (m/s)             | 2.40                                   |
| Precipitation (days)        | 23.0                                   |
| Location                    | 36.32149538375269, -119.66421703413741 |
| County                      | Kings                                  |
| City                        | Hanford                                |
| Air District                | San Joaquin Valley APCD                |
| Air Basin                   | San Joaquin Valley                     |
| TAZ                         | 2627                                   |
| EDFZ                        | 9                                      |
| Electric Utility            | Southern California Edison             |
| Gas Utility                 | Southern California Gas                |

## 1.2. Land Use Types

| Land Use Subtype        | Size | Unit     | Lot Acreage | Building Area (sq ft) | Landscape Area (sq ft) | Special Landscape Area (sq ft) | Population | Description |
|-------------------------|------|----------|-------------|-----------------------|------------------------|--------------------------------|------------|-------------|
| Medical Office Building | 72.3 | 1000sqft | 3.09        | 72,305                | 0.00                   | —                              | —          | —           |
| Hotel                   | 105  | Room     | 4.15        | 100,000               | 0.00                   | —                              | —          | —           |
| Junior College (2yr)    | 35.0 | 1000sqft | 0.95        | 35,000                | 0.00                   | 0.00                           | —          | —           |



|                                   |       |               |      |         |         |   |     |   |
|-----------------------------------|-------|---------------|------|---------|---------|---|-----|---|
| Congregate Care (Assisted Living) | 139   | Dwelling Unit | 4.76 | 123,471 | 0.00    | — | 431 | — |
| Apartments Mid Rise               | 90.0  | Dwelling Unit | 3.55 | 76,500  | 0.00    | — | 279 | — |
| Other Non-Asphalt Surfaces        | 5.00  | Acre          | 6.00 | 0.00    | 0.00    | — | —   | — |
| Parking Lot                       | 1,466 | Space         | 15.6 | 0.00    | 170,755 | — | —   | — |
| Strip Mall                        | 41.5  | 1000sqft      | 2.00 | 41,500  | 0.00    | — | —   | — |

### 1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

## 2. Emissions Summary

### 2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Un/Mit.             | ROG  | NOx  | CO   | SO2  | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2  | CO2T   | CH4  | N2O  | CO2e   |
|---------------------|------|------|------|------|-------|-------|-------|--------|--------|--------|------|--------|--------|------|------|--------|
| Daily, Summer (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —      | —      | —    | —    | —      |
| Unmit.              | 2.01 | 59.4 | 38.8 | 0.12 | 1.53  | 7.79  | 8.91  | 1.40   | 3.97   | 4.99   | —    | 15,564 | 15,564 | 0.35 | 1.42 | 16,019 |
| Daily, Winter (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —      | —      | —    | —    | —      |
| Unmit.              | 53.6 | 39.9 | 29.0 | 0.05 | 1.12  | 7.79  | 8.91  | 1.02   | 3.97   | 4.99   | —    | 5,431  | 5,431  | 0.24 | 0.22 | 5,451  |
| Average Daily (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —      | —      | —    | —    | —      |
| Unmit.              | 6.71 | 20.3 | 18.1 | 0.03 | 0.58  | 2.26  | 2.84  | 0.53   | 0.79   | 1.33   | —    | 4,820  | 4,820  | 0.16 | 0.31 | 4,920  |
| Annual (Max)        | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —      | —      | —    | —    | —      |
| Unmit.              | 1.22 | 3.70 | 3.31 | 0.01 | 0.11  | 0.41  | 0.52  | 0.10   | 0.15   | 0.24   | —    | 798    | 798    | 0.03 | 0.05 | 815    |

## 2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Year                 | ROG  | NOx  | CO   | SO2     | PM10E   | PM10D | PM10T | PM2.5E  | PM2.5D  | PM2.5T  | BCO2 | NBCO2  | CO2T   | CH4     | N2O     | CO2e   |
|----------------------|------|------|------|---------|---------|-------|-------|---------|---------|---------|------|--------|--------|---------|---------|--------|
| Daily - Summer (Max) | —    | —    | —    | —       | —       | —     | —     | —       | —       | —       | —    | —      | —      | —       | —       | —      |
| 2024                 | 2.01 | 59.4 | 38.8 | 0.12    | 1.53    | 7.79  | 8.91  | 1.40    | 3.97    | 4.99    | —    | 15,564 | 15,564 | 0.35    | 1.42    | 16,019 |
| 2025                 | 1.93 | 21.0 | 28.1 | 0.03    | 0.70    | 2.06  | 2.76  | 0.65    | 0.51    | 1.16    | —    | 5,373  | 5,373  | 0.22    | 0.21    | 5,450  |
| 2026                 | 1.77 | 20.9 | 27.0 | 0.03    | 0.70    | 2.06  | 2.76  | 0.65    | 0.51    | 1.16    | —    | 5,311  | 5,311  | 0.22    | 0.20    | 5,386  |
| Daily - Winter (Max) | —    | —    | —    | —       | —       | —     | —     | —       | —       | —       | —    | —      | —      | —       | —       | —      |
| 2024                 | 1.84 | 39.9 | 29.0 | 0.05    | 1.12    | 7.79  | 8.91  | 1.02    | 3.97    | 4.99    | —    | 5,431  | 5,431  | 0.24    | 0.22    | 5,451  |
| 2025                 | 1.71 | 21.3 | 25.0 | 0.03    | 0.70    | 2.06  | 2.76  | 0.65    | 0.51    | 1.16    | —    | 5,122  | 5,122  | 0.24    | 0.21    | 5,190  |
| 2026                 | 53.6 | 21.2 | 24.1 | 0.03    | 0.70    | 2.06  | 2.76  | 0.65    | 0.51    | 1.16    | —    | 5,066  | 5,066  | 0.17    | 0.21    | 5,133  |
| 2027                 | 53.6 | 1.26 | 2.65 | < 0.005 | 0.07    | 0.37  | 0.44  | 0.06    | 0.09    | 0.15    | —    | 509    | 509    | 0.02    | 0.02    | 515    |
| Average Daily        | —    | —    | —    | —       | —       | —     | —     | —       | —       | —       | —    | —      | —      | —       | —       | —      |
| 2024                 | 1.01 | 20.3 | 17.8 | 0.03    | 0.58    | 2.26  | 2.84  | 0.53    | 0.79    | 1.33    | —    | 4,820  | 4,820  | 0.16    | 0.31    | 4,920  |
| 2025                 | 1.23 | 15.1 | 18.1 | 0.02    | 0.50    | 1.45  | 1.95  | 0.47    | 0.36    | 0.82    | —    | 3,709  | 3,709  | 0.16    | 0.15    | 3,761  |
| 2026                 | 1.54 | 13.7 | 15.4 | 0.02    | 0.47    | 1.17  | 1.64  | 0.44    | 0.29    | 0.73    | —    | 3,131  | 3,131  | 0.10    | 0.12    | 3,172  |
| 2027                 | 6.71 | 0.16 | 0.34 | < 0.005 | 0.01    | 0.05  | 0.05  | 0.01    | 0.01    | 0.02    | —    | 65.5   | 65.5   | < 0.005 | < 0.005 | 66.2   |
| Annual               | —    | —    | —    | —       | —       | —     | —     | —       | —       | —       | —    | —      | —      | —       | —       | —      |
| 2024                 | 0.18 | 3.70 | 3.25 | 0.01    | 0.11    | 0.41  | 0.52  | 0.10    | 0.15    | 0.24    | —    | 798    | 798    | 0.03    | 0.05    | 815    |
| 2025                 | 0.23 | 2.76 | 3.31 | < 0.005 | 0.09    | 0.26  | 0.36  | 0.08    | 0.06    | 0.15    | —    | 614    | 614    | 0.03    | 0.02    | 623    |
| 2026                 | 0.28 | 2.51 | 2.81 | < 0.005 | 0.09    | 0.21  | 0.30  | 0.08    | 0.05    | 0.13    | —    | 518    | 518    | 0.02    | 0.02    | 525    |
| 2027                 | 1.22 | 0.03 | 0.06 | < 0.005 | < 0.005 | 0.01  | 0.01  | < 0.005 | < 0.005 | < 0.005 | —    | 10.8   | 10.8   | < 0.005 | < 0.005 | 11.0   |

## 2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Un/Mit.             | ROG  | NOx  | CO   | SO2  | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2  | NBCO2  | CO2T   | CH4  | N2O  | CO2e   |
|---------------------|------|------|------|------|-------|-------|-------|--------|--------|--------|-------|--------|--------|------|------|--------|
| Daily, Summer (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —     | —      | —      | —    | —    | —      |
| Unmit.              | 37.3 | 19.1 | 165  | 0.40 | 7.96  | 5.91  | 13.9  | 7.69   | 1.04   | 8.73   | 2,041 | 34,390 | 36,431 | 87.5 | 1.39 | 39,252 |
| Daily, Winter (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —     | —      | —      | —    | —    | —      |
| Unmit.              | 32.1 | 20.5 | 138  | 0.38 | 7.94  | 5.91  | 13.9  | 7.66   | 1.04   | 8.70   | 2,041 | 32,764 | 34,806 | 87.7 | 1.47 | 37,598 |
| Average Daily (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —     | —      | —      | —    | —    | —      |
| Unmit.              | 29.4 | 17.7 | 105  | 0.25 | 2.11  | 5.91  | 8.02  | 2.05   | 1.04   | 3.09   | 1,076 | 31,371 | 32,447 | 83.0 | 1.42 | 35,132 |
| Annual (Max)        | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —     | —      | —      | —    | —    | —      |
| Unmit.              | 5.37 | 3.22 | 19.2 | 0.05 | 0.39  | 1.08  | 1.46  | 0.37   | 0.19   | 0.56   | 178   | 5,194  | 5,372  | 13.7 | 0.24 | 5,817  |

## 2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Sector              | ROG  | NOx  | CO   | SO2  | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2  | NBCO2  | CO2T   | CH4  | N2O  | CO2e   |
|---------------------|------|------|------|------|-------|-------|-------|--------|--------|--------|-------|--------|--------|------|------|--------|
| Daily, Summer (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —     | —      | —      | —    | —    | —      |
| Mobile              | 18.0 | 13.0 | 86.4 | 0.20 | 0.18  | 5.91  | 6.08  | 0.17   | 1.04   | 1.21   | —     | 20,234 | 20,234 | 1.02 | 1.20 | 20,676 |
| Area                | 19.1 | 2.96 | 76.3 | 0.18 | 7.55  | —     | 7.55  | 7.28   | —      | 7.28   | 1,245 | 2,490  | 3,735  | 5.87 | 0.01 | 3,883  |
| Energy              | 0.17 | 3.05 | 2.13 | 0.02 | 0.24  | —     | 0.24  | 0.24   | —      | 0.24   | —     | 11,510 | 11,510 | 0.81 | 0.07 | 11,550 |
| Water               | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | 48.8  | 156    | 205    | 5.01 | 0.12 | 366    |
| Waste               | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | 748   | 0.00   | 748    | 74.7 | 0.00 | 2,616  |

|                           |      |      |      |         |      |      |      |      |      |      |       |        |        |      |         |        |
|---------------------------|------|------|------|---------|------|------|------|------|------|------|-------|--------|--------|------|---------|--------|
| Refrig.                   | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | —     | —      | —      | —    | —       | 161    |
| Total                     | 37.3 | 19.1 | 165  | 0.40    | 7.96 | 5.91 | 13.9 | 7.69 | 1.04 | 8.73 | 2,041 | 34,390 | 36,431 | 87.5 | 1.39    | 39,252 |
| Daily,<br>Winter<br>(Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | —     | —      | —      | —    | —       | —      |
| Mobile                    | 15.8 | 14.8 | 83.6 | 0.18    | 0.18 | 5.91 | 6.08 | 0.17 | 1.04 | 1.21 | —     | 18,687 | 18,687 | 1.24 | 1.28    | 19,102 |
| Area                      | 16.2 | 2.74 | 52.5 | 0.18    | 7.53 | —    | 7.53 | 7.26 | —    | 7.26 | 1,245 | 2,411  | 3,655  | 5.86 | < 0.005 | 3,803  |
| Energy                    | 0.17 | 3.05 | 2.13 | 0.02    | 0.24 | —    | 0.24 | 0.24 | —    | 0.24 | —     | 11,510 | 11,510 | 0.81 | 0.07    | 11,550 |
| Water                     | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | 48.8  | 156    | 205    | 5.01 | 0.12    | 366    |
| Waste                     | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | 748   | 0.00   | 748    | 74.7 | 0.00    | 2,616  |
| Refrig.                   | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | —     | —      | —      | —    | —       | 161    |
| Total                     | 32.1 | 20.5 | 138  | 0.38    | 7.94 | 5.91 | 13.9 | 7.66 | 1.04 | 8.70 | 2,041 | 32,764 | 34,806 | 87.7 | 1.47    | 37,598 |
| Average<br>Daily          | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | —     | —      | —      | —    | —       | —      |
| Mobile                    | 16.1 | 13.9 | 79.5 | 0.19    | 0.18 | 5.91 | 6.08 | 0.17 | 1.04 | 1.21 | —     | 19,124 | 19,124 | 1.12 | 1.24    | 19,546 |
| Area                      | 13.2 | 0.72 | 23.5 | 0.04    | 1.70 | —    | 1.70 | 1.64 | —    | 1.64 | 280   | 581    | 860    | 1.32 | < 0.005 | 894    |
| Energy                    | 0.17 | 3.05 | 2.13 | 0.02    | 0.24 | —    | 0.24 | 0.24 | —    | 0.24 | —     | 11,510 | 11,510 | 0.81 | 0.07    | 11,550 |
| Water                     | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | 48.8  | 156    | 205    | 5.01 | 0.12    | 366    |
| Waste                     | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | 748   | 0.00   | 748    | 74.7 | 0.00    | 2,616  |
| Refrig.                   | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | —     | —      | —      | —    | —       | 161    |
| Total                     | 29.4 | 17.7 | 105  | 0.25    | 2.11 | 5.91 | 8.02 | 2.05 | 1.04 | 3.09 | 1,076 | 31,371 | 32,447 | 83.0 | 1.42    | 35,132 |
| Annual                    | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | —     | —      | —      | —    | —       | —      |
| Mobile                    | 2.93 | 2.53 | 14.5 | 0.03    | 0.03 | 1.08 | 1.11 | 0.03 | 0.19 | 0.22 | —     | 3,166  | 3,166  | 0.19 | 0.20    | 3,236  |
| Area                      | 2.40 | 0.13 | 4.30 | 0.01    | 0.31 | —    | 0.31 | 0.30 | —    | 0.30 | 46.3  | 96.1   | 142    | 0.22 | < 0.005 | 148    |
| Energy                    | 0.03 | 0.56 | 0.39 | < 0.005 | 0.04 | —    | 0.04 | 0.04 | —    | 0.04 | —     | 1,906  | 1,906  | 0.13 | 0.01    | 1,912  |
| Water                     | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | 8.08  | 25.8   | 33.9   | 0.83 | 0.02    | 60.6   |
| Waste                     | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | 124   | 0.00   | 124    | 12.4 | 0.00    | 433    |
| Refrig.                   | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | —     | —      | —      | —    | —       | 26.6   |
| Total                     | 5.37 | 3.22 | 19.2 | 0.05    | 0.39 | 1.08 | 1.46 | 0.37 | 0.19 | 0.56 | 178   | 5,194  | 5,372  | 13.7 | 0.24    | 5,817  |



### 3. Construction Emissions Details

#### 3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location                          | ROG  | NOx  | CO   | SO2     | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T  | CH4  | N2O     | CO2e  |
|-----------------------------------|------|------|------|---------|-------|-------|-------|--------|--------|--------|------|-------|-------|------|---------|-------|
| Onsite                            | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Daily,<br>Summer<br>(Max)         | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Off-Road<br>Equipment             | 1.07 | 39.9 | 28.3 | 0.05    | 1.12  | —     | 1.12  | 1.02   | —      | 1.02   | —    | 5,296 | 5,296 | 0.21 | 0.04    | 5,314 |
| Dust From<br>Material<br>Movement | —    | —    | —    | —       | —     | 7.67  | 7.67  | —      | 3.94   | 3.94   | —    | —     | —     | —    | —       | —     |
| Onsite<br>truck                   | 0.00 | 0.00 | 0.00 | 0.00    | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Daily,<br>Winter<br>(Max)         | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Off-Road<br>Equipment             | 1.07 | 39.9 | 28.3 | 0.05    | 1.12  | —     | 1.12  | 1.02   | —      | 1.02   | —    | 5,296 | 5,296 | 0.21 | 0.04    | 5,314 |
| Dust From<br>Material<br>Movement | —    | —    | —    | —       | —     | 7.67  | 7.67  | —      | 3.94   | 3.94   | —    | —     | —     | —    | —       | —     |
| Onsite<br>truck                   | 0.00 | 0.00 | 0.00 | 0.00    | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Average<br>Daily                  | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Off-Road<br>Equipment             | 0.07 | 2.73 | 1.94 | < 0.005 | 0.08  | —     | 0.08  | 0.07   | —      | 0.07   | —    | 363   | 363   | 0.01 | < 0.005 | 364   |
| Dust From<br>Material<br>Movement | —    | —    | —    | —       | —     | 0.53  | 0.53  | —      | 0.27   | 0.27   | —    | —     | —     | —    | —       | —     |

|                             |         |         |      |         |      |         |         |      |         |         |   |      |      |         |         |      |
|-----------------------------|---------|---------|------|---------|------|---------|---------|------|---------|---------|---|------|------|---------|---------|------|
| Onsite truck                | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Annual                      | —       | —       | —    | —       | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Off-Road Equipment          | 0.01    | 0.50    | 0.35 | < 0.005 | 0.01 | —       | 0.01    | 0.01 | —       | 0.01    | — | 60.1 | 60.1 | < 0.005 | < 0.005 | 60.3 |
| Dust From Material Movement | —       | —       | —    | —       | —    | 0.10    | 0.10    | —    | 0.05    | 0.05    | — | —    | —    | —       | —       | —    |
| Onsite truck                | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Offsite                     | —       | —       | —    | —       | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Daily, Summer (Max)         | —       | —       | —    | —       | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                      | 0.09    | 0.06    | 0.97 | 0.00    | 0.00 | 0.13    | 0.13    | 0.00 | 0.03    | 0.03    | — | 153  | 153  | 0.01    | 0.01    | 156  |
| Vendor                      | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                     | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Daily, Winter (Max)         | —       | —       | —    | —       | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                      | 0.08    | 0.08    | 0.74 | 0.00    | 0.00 | 0.13    | 0.13    | 0.00 | 0.03    | 0.03    | — | 136  | 136  | 0.01    | 0.01    | 138  |
| Vendor                      | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                     | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Average Daily               | —       | —       | —    | —       | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                      | 0.01    | < 0.005 | 0.05 | 0.00    | 0.00 | 0.01    | 0.01    | 0.00 | < 0.005 | < 0.005 | — | 9.64 | 9.64 | < 0.005 | < 0.005 | 9.78 |
| Vendor                      | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                     | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Annual                      | —       | —       | —    | —       | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                      | < 0.005 | < 0.005 | 0.01 | 0.00    | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 1.60 | 1.60 | < 0.005 | < 0.005 | 1.62 |
| Vendor                      | 0.00    | 0.00    | 0.00 | 0.00    | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |

|         |      |      |      |      |      |      |      |      |      |      |   |      |      |      |      |      |
|---------|------|------|------|------|------|------|------|------|------|------|---|------|------|------|------|------|
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
|---------|------|------|------|------|------|------|------|------|------|------|---|------|------|------|------|------|

### 3.3. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location                    | ROG  | NOx  | CO   | SO2     | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T  | CH4  | N2O     | CO2e  |
|-----------------------------|------|------|------|---------|-------|-------|-------|--------|--------|--------|------|-------|-------|------|---------|-------|
| Onsite                      | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Daily, Summer (Max)         | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Off-Road Equipment          | 1.33 | 48.8 | 35.3 | 0.06    | 1.36  | —     | 1.36  | 1.23   | —      | 1.23   | —    | 6,598 | 6,598 | 0.27 | 0.05    | 6,621 |
| Dust From Material Movement | —    | —    | —    | —       | —     | 3.61  | 3.61  | —      | 1.43   | 1.43   | —    | —     | —     | —    | —       | —     |
| Onsite truck                | 0.00 | 0.00 | 0.00 | 0.00    | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Daily, Winter (Max)         | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Average Daily               | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Off-Road Equipment          | 0.22 | 8.03 | 5.81 | 0.01    | 0.22  | —     | 0.22  | 0.20   | —      | 0.20   | —    | 1,085 | 1,085 | 0.04 | 0.01    | 1,088 |
| Dust From Material Movement | —    | —    | —    | —       | —     | 0.59  | 0.59  | —      | 0.23   | 0.23   | —    | —     | —     | —    | —       | —     |
| Onsite truck                | 0.00 | 0.00 | 0.00 | 0.00    | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Annual                      | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Off-Road Equipment          | 0.04 | 1.47 | 1.06 | < 0.005 | 0.04  | —     | 0.04  | 0.04   | —      | 0.04   | —    | 180   | 180   | 0.01 | < 0.005 | 180   |

|                             |         |         |      |         |         |         |         |         |         |         |   |       |       |         |         |       |
|-----------------------------|---------|---------|------|---------|---------|---------|---------|---------|---------|---------|---|-------|-------|---------|---------|-------|
| Dust From Material Movement | —       | —       | —    | —       | —       | 0.11    | 0.11    | —       | 0.04    | 0.04    | — | —     | —     | —       | —       | —     |
| Onsite truck                | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Offsite                     | —       | —       | —    | —       | —       | —       | —       | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Daily, Summer (Max)         | —       | —       | —    | —       | —       | —       | —       | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Worker                      | 0.10    | 0.07    | 1.10 | 0.00    | 0.00    | 0.15    | 0.15    | 0.00    | 0.04    | 0.04    | — | 175   | 175   | 0.01    | 0.01    | 178   |
| Vendor                      | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Hauling                     | 0.16    | 10.5    | 2.30 | 0.06    | 0.17    | 2.32    | 2.48    | 0.17    | 0.63    | 0.80    | — | 8,791 | 8,791 | 0.07    | 1.36    | 9,220 |
| Daily, Winter (Max)         | —       | —       | —    | —       | —       | —       | —       | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Average Daily               | —       | —       | —    | —       | —       | —       | —       | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Worker                      | 0.02    | 0.01    | 0.15 | 0.00    | 0.00    | 0.02    | 0.02    | 0.00    | 0.01    | 0.01    | — | 26.4  | 26.4  | < 0.005 | < 0.005 | 26.8  |
| Vendor                      | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Hauling                     | 0.03    | 1.81    | 0.38 | 0.01    | 0.03    | 0.38    | 0.40    | 0.03    | 0.10    | 0.13    | — | 1,446 | 1,446 | 0.01    | 0.22    | 1,514 |
| Annual                      | —       | —       | —    | —       | —       | —       | —       | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Worker                      | < 0.005 | < 0.005 | 0.03 | 0.00    | 0.00    | < 0.005 | < 0.005 | 0.00    | < 0.005 | < 0.005 | — | 4.38  | 4.38  | < 0.005 | < 0.005 | 4.44  |
| Vendor                      | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Hauling                     | < 0.005 | 0.33    | 0.07 | < 0.005 | < 0.005 | 0.07    | 0.07    | < 0.005 | 0.02    | 0.02    | — | 239   | 239   | < 0.005 | 0.04    | 251   |

### 3.5. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|----------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
| Onsite   | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |



|                     |      |      |      |         |      |      |      |      |      |      |   |       |       |      |         |       |
|---------------------|------|------|------|---------|------|------|------|------|------|------|---|-------|-------|------|---------|-------|
| Daily, Summer (Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Off-Road Equipment  | 0.62 | 18.9 | 14.3 | 0.02    | 0.69 | —    | 0.69 | 0.64 | —    | 0.64 | — | 2,398 | 2,398 | 0.10 | 0.02    | 2,406 |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Daily, Winter (Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Off-Road Equipment  | 0.62 | 18.9 | 14.3 | 0.02    | 0.69 | —    | 0.69 | 0.64 | —    | 0.64 | — | 2,398 | 2,398 | 0.10 | 0.02    | 2,406 |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Average Daily       | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Off-Road Equipment  | 0.22 | 6.80 | 5.15 | 0.01    | 0.25 | —    | 0.25 | 0.23 | —    | 0.23 | — | 863   | 863   | 0.04 | 0.01    | 866   |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Annual              | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Off-Road Equipment  | 0.04 | 1.24 | 0.94 | < 0.005 | 0.05 | —    | 0.05 | 0.04 | —    | 0.04 | — | 143   | 143   | 0.01 | < 0.005 | 143   |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Offsite             | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Daily, Summer (Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Worker              | 1.34 | 0.93 | 14.3 | 0.00    | 0.00 | 1.87 | 1.87 | 0.00 | 0.45 | 0.45 | — | 2,260 | 2,260 | 0.11 | 0.08    | 2,296 |
| Vendor              | 0.06 | 1.36 | 0.67 | 0.01    | 0.01 | 0.19 | 0.20 | 0.01 | 0.05 | 0.06 | — | 778   | 778   | 0.01 | 0.11    | 814   |
| Hauling             | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |

|                     |         |      |      |         |         |      |      |         |         |         |   |       |       |         |         |       |
|---------------------|---------|------|------|---------|---------|------|------|---------|---------|---------|---|-------|-------|---------|---------|-------|
| Daily, Winter (Max) | —       | —    | —    | —       | —       | —    | —    | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Worker              | 1.17    | 1.15 | 10.9 | 0.00    | 0.00    | 1.87 | 1.87 | 0.00    | 0.45    | 0.45    | — | 2,000 | 2,000 | 0.13    | 0.08    | 2,028 |
| Vendor              | 0.05    | 1.44 | 0.70 | 0.01    | 0.01    | 0.19 | 0.20 | 0.01    | 0.05    | 0.06    | — | 780   | 780   | 0.01    | 0.11    | 814   |
| Hauling             | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Average Daily       | —       | —    | —    | —       | —       | —    | —    | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Worker              | 0.43    | 0.38 | 4.10 | 0.00    | 0.00    | 0.66 | 0.66 | 0.00    | 0.16    | 0.16    | — | 747   | 747   | 0.04    | 0.03    | 758   |
| Vendor              | 0.02    | 0.50 | 0.25 | < 0.005 | < 0.005 | 0.07 | 0.07 | < 0.005 | 0.02    | 0.02    | — | 280   | 280   | < 0.005 | 0.04    | 293   |
| Hauling             | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Annual              | —       | —    | —    | —       | —       | —    | —    | —       | —       | —       | — | —     | —     | —       | —       | —     |
| Worker              | 0.08    | 0.07 | 0.75 | 0.00    | 0.00    | 0.12 | 0.12 | 0.00    | 0.03    | 0.03    | — | 124   | 124   | 0.01    | < 0.005 | 126   |
| Vendor              | < 0.005 | 0.09 | 0.04 | < 0.005 | < 0.005 | 0.01 | 0.01 | < 0.005 | < 0.005 | < 0.005 | — | 46.4  | 46.4  | < 0.005 | 0.01    | 48.5  |
| Hauling             | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |

### 3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location            | ROG  | NOx  | CO   | SO2  | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T  | CH4  | N2O  | CO2e  |
|---------------------|------|------|------|------|-------|-------|-------|--------|--------|--------|------|-------|-------|------|------|-------|
| Onsite              | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |
| Daily, Summer (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |
| Off-Road Equipment  | 0.62 | 18.9 | 14.3 | 0.02 | 0.69  | —     | 0.69  | 0.64   | —      | 0.64   | —    | 2,398 | 2,398 | 0.10 | 0.02 | 2,406 |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00 | 0.00  |
| Daily, Winter (Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |

|                     |      |      |      |         |      |      |      |      |      |      |   |       |       |      |         |       |
|---------------------|------|------|------|---------|------|------|------|------|------|------|---|-------|-------|------|---------|-------|
| Off-Road Equipment  | 0.62 | 18.9 | 14.3 | 0.02    | 0.69 | —    | 0.69 | 0.64 | —    | 0.64 | — | 2,398 | 2,398 | 0.10 | 0.02    | 2,406 |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Average Daily       | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Off-Road Equipment  | 0.44 | 13.5 | 10.2 | 0.02    | 0.49 | —    | 0.49 | 0.46 | —    | 0.46 | — | 1,713 | 1,713 | 0.07 | 0.01    | 1,719 |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Annual              | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Off-Road Equipment  | 0.08 | 2.46 | 1.86 | < 0.005 | 0.09 | —    | 0.09 | 0.08 | —    | 0.08 | — | 284   | 284   | 0.01 | < 0.005 | 285   |
| Onsite truck        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Offsite             | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Daily, Summer (Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Worker              | 1.26 | 0.86 | 13.1 | 0.00    | 0.00 | 1.87 | 1.87 | 0.00 | 0.45 | 0.45 | — | 2,211 | 2,211 | 0.11 | 0.08    | 2,246 |
| Vendor              | 0.05 | 1.31 | 0.65 | 0.01    | 0.01 | 0.19 | 0.20 | 0.01 | 0.05 | 0.06 | — | 764   | 764   | 0.01 | 0.11    | 799   |
| Hauling             | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Daily, Winter (Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Worker              | 1.04 | 1.07 | 10.0 | 0.00    | 0.00 | 1.87 | 1.87 | 0.00 | 0.45 | 0.45 | — | 1,958 | 1,958 | 0.13 | 0.08    | 1,986 |
| Vendor              | 0.04 | 1.39 | 0.68 | 0.01    | 0.01 | 0.19 | 0.20 | 0.01 | 0.05 | 0.06 | — | 766   | 766   | 0.01 | 0.11    | 798   |
| Hauling             | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Average Daily       | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —    | —       | —     |
| Worker              | 0.76 | 0.66 | 7.46 | 0.00    | 0.00 | 1.32 | 1.32 | 0.00 | 0.32 | 0.32 | — | 1,450 | 1,450 | 0.08 | 0.06    | 1,472 |
| Vendor              | 0.03 | 0.97 | 0.47 | < 0.005 | 0.01 | 0.14 | 0.14 | 0.01 | 0.04 | 0.04 | — | 546   | 546   | 0.01 | 0.08    | 570   |

|         |      |      |      |         |         |      |      |         |      |      |   |      |      |         |      |      |
|---------|------|------|------|---------|---------|------|------|---------|------|------|---|------|------|---------|------|------|
| Hauling | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 |
| Annual  | —    | —    | —    | —       | —       | —    | —    | —       | —    | —    | — | —    | —    | —       | —    | —    |
| Worker  | 0.14 | 0.12 | 1.36 | 0.00    | 0.00    | 0.24 | 0.24 | 0.00    | 0.06 | 0.06 | — | 240  | 240  | 0.01    | 0.01 | 244  |
| Vendor  | 0.01 | 0.18 | 0.09 | < 0.005 | < 0.005 | 0.02 | 0.03 | < 0.005 | 0.01 | 0.01 | — | 90.5 | 90.5 | < 0.005 | 0.01 | 94.4 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 |

### 3.9. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location                  | ROG  | NOx  | CO   | SO2  | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T  | CH4  | N2O  | CO2e  |
|---------------------------|------|------|------|------|-------|-------|-------|--------|--------|--------|------|-------|-------|------|------|-------|
| Onsite                    | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |
| Daily,<br>Summer<br>(Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |
| Off-Road<br>Equipment     | 0.62 | 18.9 | 14.3 | 0.02 | 0.69  | —     | 0.69  | 0.64   | —      | 0.64   | —    | 2,397 | 2,397 | 0.10 | 0.02 | 2,405 |
| Onsite<br>truck           | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00 | 0.00  |
| Daily,<br>Winter<br>(Max) | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |
| Off-Road<br>Equipment     | 0.62 | 18.9 | 14.3 | 0.02 | 0.69  | —     | 0.69  | 0.64   | —      | 0.64   | —    | 2,397 | 2,397 | 0.10 | 0.02 | 2,405 |
| Onsite<br>truck           | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00 | 0.00  |
| Average<br>Daily          | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |
| Off-Road<br>Equipment     | 0.35 | 10.7 | 8.09 | 0.01 | 0.39  | —     | 0.39  | 0.36   | —      | 0.36   | —    | 1,356 | 1,356 | 0.05 | 0.01 | 1,360 |
| Onsite<br>truck           | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00  | 0.00 | 0.00 | 0.00  |
| Annual                    | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —    | —     |



|                     |         |      |      |         |         |      |      |         |      |      |   |       |       |         |         |       |
|---------------------|---------|------|------|---------|---------|------|------|---------|------|------|---|-------|-------|---------|---------|-------|
| Off-Road Equipment  | 0.06    | 1.95 | 1.48 | < 0.005 | 0.07    | —    | 0.07 | 0.07    | —    | 0.07 | — | 224   | 224   | 0.01    | < 0.005 | 225   |
| Onsite truck        | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Offsite             | —       | —    | —    | —       | —       | —    | —    | —       | —    | —    | — | —     | —     | —       | —       | —     |
| Daily, Summer (Max) | —       | —    | —    | —       | —       | —    | —    | —       | —    | —    | — | —     | —     | —       | —       | —     |
| Worker              | 1.10    | 0.72 | 12.0 | 0.00    | 0.00    | 1.87 | 1.87 | 0.00    | 0.45 | 0.45 | — | 2,164 | 2,164 | 0.11    | 0.08    | 2,197 |
| Vendor              | 0.05    | 1.27 | 0.62 | 0.01    | 0.01    | 0.19 | 0.20 | 0.01    | 0.05 | 0.06 | — | 750   | 750   | 0.01    | 0.11    | 784   |
| Hauling             | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Daily, Winter (Max) | —       | —    | —    | —       | —       | —    | —    | —       | —    | —    | — | —     | —     | —       | —       | —     |
| Worker              | 0.97    | 0.94 | 9.17 | 0.00    | 0.00    | 1.87 | 1.87 | 0.00    | 0.45 | 0.45 | — | 1,917 | 1,917 | 0.06    | 0.08    | 1,943 |
| Vendor              | 0.04    | 1.36 | 0.65 | 0.01    | 0.01    | 0.19 | 0.20 | 0.01    | 0.05 | 0.06 | — | 752   | 752   | 0.01    | 0.11    | 784   |
| Hauling             | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Average Daily       | —       | —    | —    | —       | —       | —    | —    | —       | —    | —    | — | —     | —     | —       | —       | —     |
| Worker              | 0.56    | 0.48 | 5.41 | 0.00    | 0.00    | 1.04 | 1.04 | 0.00    | 0.25 | 0.25 | — | 1,124 | 1,124 | 0.03    | 0.05    | 1,141 |
| Vendor              | 0.03    | 0.74 | 0.36 | < 0.005 | 0.01    | 0.11 | 0.11 | 0.01    | 0.03 | 0.04 | — | 425   | 425   | 0.01    | 0.06    | 443   |
| Hauling             | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Annual              | —       | —    | —    | —       | —       | —    | —    | —       | —    | —    | — | —     | —     | —       | —       | —     |
| Worker              | 0.10    | 0.09 | 0.99 | 0.00    | 0.00    | 0.19 | 0.19 | 0.00    | 0.05 | 0.05 | — | 186   | 186   | < 0.005 | 0.01    | 189   |
| Vendor              | < 0.005 | 0.14 | 0.07 | < 0.005 | < 0.005 | 0.02 | 0.02 | < 0.005 | 0.01 | 0.01 | — | 70.3  | 70.3  | < 0.005 | 0.01    | 73.4  |
| Hauling             | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |

### 3.11. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|----------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
|----------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|

|                           |      |      |      |         |      |      |      |      |      |      |   |       |       |         |         |       |
|---------------------------|------|------|------|---------|------|------|------|------|------|------|---|-------|-------|---------|---------|-------|
| Onsite                    | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Daily,<br>Summer<br>(Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Daily,<br>Winter<br>(Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Off-Road<br>Equipment     | 0.50 | 13.3 | 10.6 | 0.01    | 0.58 | —    | 0.58 | 0.54 | —    | 0.54 | — | 1,511 | 1,511 | 0.06    | 0.01    | 1,516 |
| Paving                    | 0.82 | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Onsite<br>truck           | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Average<br>Daily          | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Off-Road<br>Equipment     | 0.07 | 1.82 | 1.45 | < 0.005 | 0.08 | —    | 0.08 | 0.07 | —    | 0.07 | — | 207   | 207   | 0.01    | < 0.005 | 208   |
| Paving                    | 0.11 | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Onsite<br>truck           | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Annual                    | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Off-Road<br>Equipment     | 0.01 | 0.33 | 0.27 | < 0.005 | 0.01 | —    | 0.01 | 0.01 | —    | 0.01 | — | 34.3  | 34.3  | < 0.005 | < 0.005 | 34.4  |
| Paving                    | 0.02 | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Onsite<br>truck           | 0.00 | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Offsite                   | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Daily,<br>Summer<br>(Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Daily,<br>Winter<br>(Max) | —    | —    | —    | —       | —    | —    | —    | —    | —    | —    | — | —     | —     | —       | —       | —     |
| Worker                    | 0.06 | 0.05 | 0.53 | 0.00    | 0.00 | 0.11 | 0.11 | 0.00 | 0.03 | 0.03 | — | 111   | 111   | < 0.005 | < 0.005 | 113   |

|               |         |         |      |      |      |         |         |      |         |         |   |      |      |         |         |      |
|---------------|---------|---------|------|------|------|---------|---------|------|---------|---------|---|------|------|---------|---------|------|
| Vendor        | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling       | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Average Daily | —       | —       | —    | —    | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker        | 0.01    | 0.01    | 0.08 | 0.00 | 0.00 | 0.01    | 0.01    | 0.00 | < 0.005 | < 0.005 | — | 15.8 | 15.8 | < 0.005 | < 0.005 | 16.1 |
| Vendor        | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling       | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Annual        | —       | —       | —    | —    | —    | —       | —       | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker        | < 0.005 | < 0.005 | 0.01 | 0.00 | 0.00 | < 0.005 | < 0.005 | 0.00 | < 0.005 | < 0.005 | — | 2.62 | 2.62 | < 0.005 | < 0.005 | 2.66 |
| Vendor        | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling       | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |

### 3.13. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location               | ROG  | NOx  | CO   | SO2     | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4  | N2O     | CO2e |
|------------------------|------|------|------|---------|-------|-------|-------|--------|--------|--------|------|-------|------|------|---------|------|
| Onsite                 | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —    | —    | —       | —    |
| Daily, Summer (Max)    | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —    | —    | —       | —    |
| Daily, Winter (Max)    | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —    | —    | —       | —    |
| Off-Road Equipment     | 0.05 | 1.09 | 0.96 | < 0.005 | 0.07  | —     | 0.07  | 0.06   | —      | 0.06   | —    | 134   | 134  | 0.01 | < 0.005 | 134  |
| Architectural Coatings | 53.3 | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —    | —    | —       | —    |
| Onsite truck           | 0.00 | 0.00 | 0.00 | 0.00    | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00  | 0.00 | 0.00 | 0.00    | 0.00 |
| Average Daily          | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —    | —    | —       | —    |

|                        |         |         |         |         |         |         |         |         |         |         |   |      |      |         |         |      |
|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---|------|------|---------|---------|------|
| Off-Road Equipment     | < 0.005 | 0.01    | 0.01    | < 0.005 | < 0.005 | —       | < 0.005 | < 0.005 | —       | < 0.005 | — | 1.05 | 1.05 | < 0.005 | < 0.005 | 1.05 |
| Architectural Coatings | 0.42    | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Onsite truck           | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Annual                 | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Off-Road Equipment     | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | —       | < 0.005 | < 0.005 | —       | < 0.005 | — | 0.17 | 0.17 | < 0.005 | < 0.005 | 0.17 |
| Architectural Coatings | 0.08    | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Onsite truck           | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Offsite                | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Daily, Summer (Max)    | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Daily, Winter (Max)    | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                 | 0.19    | 0.19    | 1.83    | 0.00    | 0.00    | 0.37    | 0.37    | 0.00    | 0.09    | 0.09    | — | 383  | 383  | 0.01    | 0.02    | 389  |
| Vendor                 | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Average Daily          | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                 | < 0.005 | < 0.005 | 0.01    | 0.00    | 0.00    | < 0.005 | < 0.005 | 0.00    | < 0.005 | < 0.005 | — | 3.11 | 3.11 | < 0.005 | < 0.005 | 3.16 |
| Vendor                 | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Annual                 | —       | —       | —       | —       | —       | —       | —       | —       | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                 | < 0.005 | < 0.005 | < 0.005 | 0.00    | 0.00    | < 0.005 | < 0.005 | 0.00    | < 0.005 | < 0.005 | — | 0.52 | 0.52 | < 0.005 | < 0.005 | 0.52 |



|         |      |      |      |      |      |      |      |      |      |      |   |      |      |      |      |      |
|---------|------|------|------|------|------|------|------|------|------|------|---|------|------|------|------|------|
| Vendor  | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

### 3.15. Architectural Coating (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Location                      | ROG     | NOx  | CO   | SO2     | PM10E   | PM10D | PM10T   | PM2.5E  | PM2.5D | PM2.5T  | BCO2 | NBCO2 | CO2T | CH4     | N2O     | CO2e |
|-------------------------------|---------|------|------|---------|---------|-------|---------|---------|--------|---------|------|-------|------|---------|---------|------|
| Onsite                        | —       | —    | —    | —       | —       | —     | —       | —       | —      | —       | —    | —     | —    | —       | —       | —    |
| Daily,<br>Summer<br>(Max)     | —       | —    | —    | —       | —       | —     | —       | —       | —      | —       | —    | —     | —    | —       | —       | —    |
| Daily,<br>Winter<br>(Max)     | —       | —    | —    | —       | —       | —     | —       | —       | —      | —       | —    | —     | —    | —       | —       | —    |
| Off-Road<br>Equipment         | 0.05    | 1.09 | 0.96 | < 0.005 | 0.07    | —     | 0.07    | 0.06    | —      | 0.06    | —    | 134   | 134  | 0.01    | < 0.005 | 134  |
| Architectu<br>ral<br>Coatings | 53.3    | —    | —    | —       | —       | —     | —       | —       | —      | —       | —    | —     | —    | —       | —       | —    |
| Onsite<br>truck               | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00  | 0.00    | 0.00    | 0.00   | 0.00    | —    | 0.00  | 0.00 | 0.00    | 0.00    | 0.00 |
| Average<br>Daily              | —       | —    | —    | —       | —       | —     | —       | —       | —      | —       | —    | —     | —    | —       | —       | —    |
| Off-Road<br>Equipment         | 0.01    | 0.14 | 0.12 | < 0.005 | 0.01    | —     | 0.01    | 0.01    | —      | 0.01    | —    | 16.7  | 16.7 | < 0.005 | < 0.005 | 16.8 |
| Architectu<br>ral<br>Coatings | 6.68    | —    | —    | —       | —       | —     | —       | —       | —      | —       | —    | —     | —    | —       | —       | —    |
| Onsite<br>truck               | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | 0.00  | 0.00    | 0.00    | 0.00   | 0.00    | —    | 0.00  | 0.00 | 0.00    | 0.00    | 0.00 |
| Annual                        | —       | —    | —    | —       | —       | —     | —       | —       | —      | —       | —    | —     | —    | —       | —       | —    |
| Off-Road<br>Equipment         | < 0.005 | 0.02 | 0.02 | < 0.005 | < 0.005 | —     | < 0.005 | < 0.005 | —      | < 0.005 | —    | 2.77  | 2.77 | < 0.005 | < 0.005 | 2.78 |

|                           |         |         |      |      |      |      |      |      |         |         |   |      |      |         |         |      |
|---------------------------|---------|---------|------|------|------|------|------|------|---------|---------|---|------|------|---------|---------|------|
| Architectu<br>Coatings    | 1.22    | —       | —    | —    | —    | —    | —    | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Onsite<br>truck           | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Offsite                   | —       | —       | —    | —    | —    | —    | —    | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Daily,<br>Summer<br>(Max) | —       | —       | —    | —    | —    | —    | —    | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Daily,<br>Winter<br>(Max) | —       | —       | —    | —    | —    | —    | —    | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                    | 0.18    | 0.17    | 1.69 | 0.00 | 0.00 | 0.37 | 0.37 | 0.00 | 0.09    | 0.09    | — | 376  | 376  | 0.01    | 0.02    | 381  |
| Vendor                    | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                   | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Average<br>Daily          | —       | —       | —    | —    | —    | —    | —    | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                    | 0.02    | 0.02    | 0.22 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.01    | 0.01    | — | 48.8 | 48.8 | < 0.005 | < 0.005 | 49.5 |
| Vendor                    | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                   | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Annual                    | —       | —       | —    | —    | —    | —    | —    | —    | —       | —       | — | —    | —    | —       | —       | —    |
| Worker                    | < 0.005 | < 0.005 | 0.04 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | < 0.005 | < 0.005 | — | 8.08 | 8.08 | < 0.005 | < 0.005 | 8.19 |
| Vendor                    | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Hauling                   | 0.00    | 0.00    | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |

## 4. Operations Emissions Details

### 4.1. Mobile Emissions by Land Use

#### 4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use                          | ROG  | NOx  | CO   | SO2  | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2  | CO2T   | CH4  | N2O  | CO2e   |
|-----------------------------------|------|------|------|------|-------|-------|-------|--------|--------|--------|------|--------|--------|------|------|--------|
| Daily, Summer (Max)               | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —      | —      | —    | —    | —      |
| Medical Office Building           | 4.77 | 3.39 | 22.4 | 0.05 | 0.05  | 1.51  | 1.55  | 0.04   | 0.27   | 0.31   | —    | 5,169  | 5,169  | 0.27 | 0.31 | 5,283  |
| Hotel                             | 2.34 | 1.66 | 11.0 | 0.02 | 0.02  | 0.74  | 0.76  | 0.02   | 0.13   | 0.15   | —    | 2,532  | 2,532  | 0.13 | 0.15 | 2,588  |
| Junior College (2yr)              | 2.18 | 1.55 | 10.2 | 0.02 | 0.02  | 0.69  | 0.71  | 0.02   | 0.12   | 0.14   | —    | 2,367  | 2,367  | 0.12 | 0.14 | 2,419  |
| Congregate Care (Assisted Living) | 2.31 | 1.77 | 11.9 | 0.03 | 0.02  | 0.85  | 0.87  | 0.02   | 0.15   | 0.17   | —    | 2,886  | 2,886  | 0.13 | 0.17 | 2,947  |
| Apartments Mid Rise               | 2.01 | 1.54 | 10.3 | 0.02 | 0.02  | 0.74  | 0.76  | 0.02   | 0.13   | 0.15   | —    | 2,507  | 2,507  | 0.12 | 0.14 | 2,560  |
| Other Non-Asphalt Surfaces        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00   | 0.00   | 0.00 | 0.00 | 0.00   |
| Parking Lot                       | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | —    | 0.00   | 0.00   | 0.00 | 0.00 | 0.00   |
| Strip Mall                        | 4.40 | 3.13 | 20.6 | 0.05 | 0.04  | 1.39  | 1.43  | 0.04   | 0.24   | 0.28   | —    | 4,773  | 4,773  | 0.25 | 0.29 | 4,878  |
| Total                             | 18.0 | 13.0 | 86.4 | 0.20 | 0.18  | 5.91  | 6.08  | 0.17   | 1.04   | 1.21   | —    | 20,234 | 20,234 | 1.02 | 1.20 | 20,676 |
| Daily, Winter (Max)               | —    | —    | —    | —    | —     | —     | —     | —      | —      | —      | —    | —      | —      | —    | —    | —      |
| Medical Office Building           | 4.17 | 3.83 | 21.8 | 0.05 | 0.05  | 1.51  | 1.55  | 0.04   | 0.27   | 0.31   | —    | 4,775  | 4,775  | 0.33 | 0.33 | 4,883  |
| Hotel                             | 2.04 | 1.88 | 10.7 | 0.02 | 0.02  | 0.74  | 0.76  | 0.02   | 0.13   | 0.15   | —    | 2,339  | 2,339  | 0.16 | 0.16 | 2,392  |

|                                   |      |      |      |         |         |      |      |         |      |      |   |        |        |      |      |        |
|-----------------------------------|------|------|------|---------|---------|------|------|---------|------|------|---|--------|--------|------|------|--------|
| Junior College (2yr)              | 1.91 | 1.75 | 9.98 | 0.02    | 0.02    | 0.69 | 0.71 | 0.02    | 0.12 | 0.14 | — | 2,187  | 2,187  | 0.15 | 0.15 | 2,236  |
| Congregate Care (Assisted Living) | 2.03 | 2.01 | 11.3 | 0.03    | 0.02    | 0.85 | 0.87 | 0.02    | 0.15 | 0.17 | — | 2,663  | 2,663  | 0.16 | 0.18 | 2,720  |
| Apartment s Mid Rise              | 1.76 | 1.74 | 9.79 | 0.02    | 0.02    | 0.74 | 0.76 | 0.02    | 0.13 | 0.15 | — | 2,314  | 2,314  | 0.14 | 0.15 | 2,363  |
| Other Non-Asphalt Surfaces        | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00   | 0.00   | 0.00 | 0.00 | 0.00   |
| Parking Lot                       | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | 0.00 | — | 0.00   | 0.00   | 0.00 | 0.00 | 0.00   |
| Strip Mall                        | 3.85 | 3.54 | 20.1 | 0.04    | 0.04    | 1.39 | 1.43 | 0.04    | 0.24 | 0.28 | — | 4,409  | 4,409  | 0.30 | 0.31 | 4,508  |
| Total                             | 15.8 | 14.8 | 83.6 | 0.18    | 0.18    | 5.91 | 6.08 | 0.17    | 1.04 | 1.21 | — | 18,687 | 18,687 | 1.24 | 1.28 | 19,102 |
| Annual                            | —    | —    | —    | —       | —       | —    | —    | —       | —    | —    | — | —      | —      | —    | —    | —      |
| Medical Office Building           | 0.78 | 0.66 | 3.77 | 0.01    | 0.01    | 0.27 | 0.28 | 0.01    | 0.05 | 0.06 | — | 809    | 809    | 0.05 | 0.05 | 827    |
| Hotel                             | 0.38 | 0.32 | 1.85 | < 0.005 | < 0.005 | 0.13 | 0.14 | < 0.005 | 0.02 | 0.03 | — | 396    | 396    | 0.02 | 0.03 | 405    |
| Junior College (2yr)              | 0.36 | 0.30 | 1.73 | < 0.005 | < 0.005 | 0.13 | 0.13 | < 0.005 | 0.02 | 0.03 | — | 370    | 370    | 0.02 | 0.02 | 379    |
| Congregate Care (Assisted Living) | 0.38 | 0.34 | 1.97 | < 0.005 | < 0.005 | 0.15 | 0.16 | < 0.005 | 0.03 | 0.03 | — | 451    | 451    | 0.02 | 0.03 | 461    |
| Apartment s Mid Rise              | 0.33 | 0.30 | 1.71 | < 0.005 | < 0.005 | 0.13 | 0.14 | < 0.005 | 0.02 | 0.03 | — | 392    | 392    | 0.02 | 0.02 | 400    |



|                            |      |      |      |      |      |      |      |      |      |      |   |       |       |      |      |       |
|----------------------------|------|------|------|------|------|------|------|------|------|------|---|-------|-------|------|------|-------|
| Other Non-Asphalt Surfaces | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00 | 0.00  |
| Parking Lot                | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00 | 0.00  |
| Strip Mall                 | 0.72 | 0.61 | 3.48 | 0.01 | 0.01 | 0.25 | 0.26 | 0.01 | 0.04 | 0.05 | — | 747   | 747   | 0.05 | 0.05 | 764   |
| Total                      | 2.93 | 2.53 | 14.5 | 0.03 | 0.03 | 1.08 | 1.11 | 0.03 | 0.19 | 0.22 | — | 3,166 | 3,166 | 0.19 | 0.20 | 3,236 |

## 4.2. Energy

### 4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use                          | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T  | CH4  | N2O     | CO2e  |
|-----------------------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|-------|------|---------|-------|
| Daily, Summer (Max)               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —     | —    | —       | —     |
| Medical Office Building           | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | 2,034 | 2,034 | 0.13 | 0.02    | 2,042 |
| Hotel                             | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | 2,046 | 2,046 | 0.13 | 0.02    | 2,053 |
| Junior College (2yr)              | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | 533   | 533   | 0.03 | < 0.005 | 535   |
| Congregate Care (Assisted Living) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | 1,023 | 1,023 | 0.06 | 0.01    | 1,027 |
| Apartment s Mid Rise              | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | 662   | 662   | 0.04 | < 0.005 | 665   |
| Other Non-Asphalt Surfaces        | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |

|                                   |   |   |   |   |   |   |   |   |   |   |   |       |       |      |         |       |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|-------|-------|------|---------|-------|
| Parking Lot                       | — | — | — | — | — | — | — | — | — | — | — | 870   | 870   | 0.05 | 0.01    | 873   |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | — | 623   | 623   | 0.04 | < 0.005 | 625   |
| Total                             | — | — | — | — | — | — | — | — | — | — | — | 7,790 | 7,790 | 0.48 | 0.06    | 7,820 |
| Daily, Winter (Max)               | — | — | — | — | — | — | — | — | — | — | — | —     | —     | —    | —       | —     |
| Medical Office Building           | — | — | — | — | — | — | — | — | — | — | — | 2,034 | 2,034 | 0.13 | 0.02    | 2,042 |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | — | 2,046 | 2,046 | 0.13 | 0.02    | 2,053 |
| Junior College (2yr)              | — | — | — | — | — | — | — | — | — | — | — | 533   | 533   | 0.03 | < 0.005 | 535   |
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | — | 1,023 | 1,023 | 0.06 | 0.01    | 1,027 |
| Apartment s Mid Rise              | — | — | — | — | — | — | — | — | — | — | — | 662   | 662   | 0.04 | < 0.005 | 665   |
| Other Non-Asphalt Surfaces        | — | — | — | — | — | — | — | — | — | — | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Parking Lot                       | — | — | — | — | — | — | — | — | — | — | — | 870   | 870   | 0.05 | 0.01    | 873   |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | — | 623   | 623   | 0.04 | < 0.005 | 625   |
| Total                             | — | — | — | — | — | — | — | — | — | — | — | 7,790 | 7,790 | 0.48 | 0.06    | 7,820 |
| Annual                            | — | — | — | — | — | — | — | — | — | — | — | —     | —     | —    | —       | —     |
| Medical Office Building           | — | — | — | — | — | — | — | — | — | — | — | 337   | 337   | 0.02 | < 0.005 | 338   |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | — | 339   | 339   | 0.02 | < 0.005 | 340   |

|                                   |   |   |   |   |   |   |   |   |   |   |   |       |       |      |         |       |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|-------|-------|------|---------|-------|
| Junior College (2yr)              | — | — | — | — | — | — | — | — | — | — | — | 88.3  | 88.3  | 0.01 | < 0.005 | 88.6  |
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | — | 169   | 169   | 0.01 | < 0.005 | 170   |
| Apartment s Mid Rise              | — | — | — | — | — | — | — | — | — | — | — | 110   | 110   | 0.01 | < 0.005 | 110   |
| Other Non-Asphalt Surfaces        | — | — | — | — | — | — | — | — | — | — | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Parking Lot                       | — | — | — | — | — | — | — | — | — | — | — | 144   | 144   | 0.01 | < 0.005 | 145   |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | — | 103   | 103   | 0.01 | < 0.005 | 104   |
| Total                             | — | — | — | — | — | — | — | — | — | — | — | 1,290 | 1,290 | 0.08 | 0.01    | 1,295 |

#### 4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use                | ROG  | NOx  | CO   | SO2     | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4  | N2O     | CO2e |
|-------------------------|------|------|------|---------|-------|-------|-------|--------|--------|--------|------|-------|------|------|---------|------|
| Daily, Summer (Max)     | —    | —    | —    | —       | —     | —     | —     | —      | —      | —      | —    | —     | —    | —    | —       | —    |
| Medical Office Building | 0.04 | 0.71 | 0.60 | < 0.005 | 0.05  | —     | 0.05  | 0.05   | —      | 0.05   | —    | 852   | 852  | 0.08 | < 0.005 | 854  |
| Hotel                   | 0.04 | 0.81 | 0.68 | < 0.005 | 0.06  | —     | 0.06  | 0.06   | —      | 0.06   | —    | 967   | 967  | 0.09 | < 0.005 | 970  |
| Junior College (2yr)    | 0.02 | 0.42 | 0.35 | < 0.005 | 0.03  | —     | 0.03  | 0.03   | —      | 0.03   | —    | 502   | 502  | 0.04 | < 0.005 | 503  |

|                                   |         |      |      |         |      |   |      |      |   |      |   |       |       |      |         |       |
|-----------------------------------|---------|------|------|---------|------|---|------|------|---|------|---|-------|-------|------|---------|-------|
| Congregate Care (Assisted Living) | 0.04    | 0.63 | 0.27 | < 0.005 | 0.05 | — | 0.05 | 0.05 | — | 0.05 | — | 801   | 801   | 0.07 | < 0.005 | 803   |
| Apartment<br>s<br>Mid Rise        | 0.02    | 0.41 | 0.17 | < 0.005 | 0.03 | — | 0.03 | 0.03 | — | 0.03 | — | 519   | 519   | 0.05 | < 0.005 | 520   |
| Other<br>Non-Asphalt<br>Surfaces  | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | — | 0.00 | 0.00 | — | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Parking<br>Lot                    | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | — | 0.00 | 0.00 | — | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |
| Strip Mall                        | < 0.005 | 0.07 | 0.06 | < 0.005 | 0.01 | — | 0.01 | 0.01 | — | 0.01 | — | 80.4  | 80.4  | 0.01 | < 0.005 | 80.6  |
| Total                             | 0.17    | 3.05 | 2.13 | 0.02    | 0.24 | — | 0.24 | 0.24 | — | 0.24 | — | 3,720 | 3,720 | 0.33 | 0.01    | 3,730 |
| Daily,<br>Winter<br>(Max)         | —       | —    | —    | —       | —    | — | —    | —    | — | —    | — | —     | —     | —    | —       | —     |
| Medical<br>Office<br>Building     | 0.04    | 0.71 | 0.60 | < 0.005 | 0.05 | — | 0.05 | 0.05 | — | 0.05 | — | 852   | 852   | 0.08 | < 0.005 | 854   |
| Hotel                             | 0.04    | 0.81 | 0.68 | < 0.005 | 0.06 | — | 0.06 | 0.06 | — | 0.06 | — | 967   | 967   | 0.09 | < 0.005 | 970   |
| Junior<br>College<br>(2yr)        | 0.02    | 0.42 | 0.35 | < 0.005 | 0.03 | — | 0.03 | 0.03 | — | 0.03 | — | 502   | 502   | 0.04 | < 0.005 | 503   |
| Congregate Care (Assisted Living) | 0.04    | 0.63 | 0.27 | < 0.005 | 0.05 | — | 0.05 | 0.05 | — | 0.05 | — | 801   | 801   | 0.07 | < 0.005 | 803   |
| Apartment<br>s<br>Mid Rise        | 0.02    | 0.41 | 0.17 | < 0.005 | 0.03 | — | 0.03 | 0.03 | — | 0.03 | — | 519   | 519   | 0.05 | < 0.005 | 520   |
| Other<br>Non-Asphalt<br>Surfaces  | 0.00    | 0.00 | 0.00 | 0.00    | 0.00 | — | 0.00 | 0.00 | — | 0.00 | — | 0.00  | 0.00  | 0.00 | 0.00    | 0.00  |



|                                   |         |      |      |         |         |   |         |         |   |         |   |       |       |         |         |       |
|-----------------------------------|---------|------|------|---------|---------|---|---------|---------|---|---------|---|-------|-------|---------|---------|-------|
| Parking Lot                       | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00    | 0.00    | — | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Strip Mall                        | < 0.005 | 0.07 | 0.06 | < 0.005 | 0.01    | — | 0.01    | 0.01    | — | 0.01    | — | 80.4  | 80.4  | 0.01    | < 0.005 | 80.6  |
| Total                             | 0.17    | 3.05 | 2.13 | 0.02    | 0.24    | — | 0.24    | 0.24    | — | 0.24    | — | 3,720 | 3,720 | 0.33    | 0.01    | 3,730 |
| Annual                            | —       | —    | —    | —       | —       | — | —       | —       | — | —       | — | —     | —     | —       | —       | —     |
| Medical Office Building           | 0.01    | 0.13 | 0.11 | < 0.005 | 0.01    | — | 0.01    | 0.01    | — | 0.01    | — | 141   | 141   | 0.01    | < 0.005 | 141   |
| Hotel                             | 0.01    | 0.15 | 0.12 | < 0.005 | 0.01    | — | 0.01    | 0.01    | — | 0.01    | — | 160   | 160   | 0.01    | < 0.005 | 161   |
| Junior College (2yr)              | < 0.005 | 0.08 | 0.06 | < 0.005 | 0.01    | — | 0.01    | 0.01    | — | 0.01    | — | 83.0  | 83.0  | 0.01    | < 0.005 | 83.3  |
| Congregate Care (Assisted Living) | 0.01    | 0.12 | 0.05 | < 0.005 | 0.01    | — | 0.01    | 0.01    | — | 0.01    | — | 133   | 133   | 0.01    | < 0.005 | 133   |
| Apartment s Mid Rise              | < 0.005 | 0.07 | 0.03 | < 0.005 | 0.01    | — | 0.01    | 0.01    | — | 0.01    | — | 85.9  | 85.9  | 0.01    | < 0.005 | 86.1  |
| Other Non-Asphalt Surfaces        | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00    | 0.00    | — | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Parking Lot                       | 0.00    | 0.00 | 0.00 | 0.00    | 0.00    | — | 0.00    | 0.00    | — | 0.00    | — | 0.00  | 0.00  | 0.00    | 0.00    | 0.00  |
| Strip Mall                        | < 0.005 | 0.01 | 0.01 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | — | 13.3  | 13.3  | < 0.005 | < 0.005 | 13.3  |
| Total                             | 0.03    | 0.56 | 0.39 | < 0.005 | 0.04    | — | 0.04    | 0.04    | — | 0.04    | — | 616   | 616   | 0.05    | < 0.005 | 618   |

### 4.3. Area Emissions by Source

#### 4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Source | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|--------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
|--------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|

|                        |      |      |      |         |         |   |         |         |   |         |       |       |       |         |         |       |
|------------------------|------|------|------|---------|---------|---|---------|---------|---|---------|-------|-------|-------|---------|---------|-------|
| Daily, Summer (Max)    | —    | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Hearths                | 5.80 | 2.74 | 52.5 | 0.18    | 7.53    | — | 7.53    | 7.26    | — | 7.26    | 1,245 | 2,411 | 3,655 | 5.86    | < 0.005 | 3,803 |
| Consumer Products      | 9.68 | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Architectural Coatings | 0.73 | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Landscap e Equipmen t  | 2.92 | 0.22 | 23.8 | < 0.005 | 0.02    | — | 0.02    | 0.03    | — | 0.03    | —     | 79.2  | 79.2  | < 0.005 | < 0.005 | 79.5  |
| Total                  | 19.1 | 2.96 | 76.3 | 0.18    | 7.55    | — | 7.55    | 7.28    | — | 7.28    | 1,245 | 2,490 | 3,735 | 5.87    | 0.01    | 3,883 |
| Daily, Winter (Max)    | —    | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Hearths                | 5.80 | 2.74 | 52.5 | 0.18    | 7.53    | — | 7.53    | 7.26    | — | 7.26    | 1,245 | 2,411 | 3,655 | 5.86    | < 0.005 | 3,803 |
| Consumer Products      | 9.68 | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Architectural Coatings | 0.73 | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Total                  | 16.2 | 2.74 | 52.5 | 0.18    | 7.53    | — | 7.53    | 7.26    | — | 7.26    | 1,245 | 2,411 | 3,655 | 5.86    | < 0.005 | 3,803 |
| Annual                 | —    | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Hearths                | 0.24 | 0.11 | 2.15 | 0.01    | 0.31    | — | 0.31    | 0.30    | — | 0.30    | 46.3  | 89.7  | 136   | 0.22    | < 0.005 | 141   |
| Consumer Products      | 1.77 | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Architectural Coatings | 0.13 | —    | —    | —       | —       | — | —       | —       | — | —       | —     | —     | —     | —       | —       | —     |
| Landscap e Equipmen t  | 0.26 | 0.02 | 2.14 | < 0.005 | < 0.005 | — | < 0.005 | < 0.005 | — | < 0.005 | —     | 6.47  | 6.47  | < 0.005 | < 0.005 | 6.49  |

|       |      |      |      |      |      |   |      |      |   |      |      |      |     |      |         |     |
|-------|------|------|------|------|------|---|------|------|---|------|------|------|-----|------|---------|-----|
| Total | 2.40 | 0.13 | 4.30 | 0.01 | 0.31 | — | 0.31 | 0.30 | — | 0.30 | 46.3 | 96.1 | 142 | 0.22 | < 0.005 | 148 |
|-------|------|------|------|------|------|---|------|------|---|------|------|------|-----|------|---------|-----|

## 4.4. Water Emissions by Land Use

### 4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use                          | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4     | N2O     | CO2e |
|-----------------------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|---------|---------|------|
| Daily, Summer (Max)               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —       | —       | —    |
| Medical Office Building           | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 17.4 | 52.1  | 69.5 | 1.79    | 0.04    | 127  |
| Hotel                             | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 5.10 | 15.3  | 20.4 | 0.52    | 0.01    | 37.2 |
| Junior College (2yr)              | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 3.29 | 9.86  | 13.1 | 0.34    | 0.01    | 24.0 |
| Congregate Care (Assisted Living) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 10.4 | 31.2  | 41.5 | 1.07    | 0.03    | 75.9 |
| Apartment s Mid Rise              | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 6.73 | 20.2  | 26.9 | 0.69    | 0.02    | 49.1 |
| Other Non-Asphalt Surfaces        | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 0.00 | 0.00  | 0.00 | 0.00    | 0.00    | 0.00 |
| Parking Lot                       | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 0.00 | 9.65  | 9.65 | < 0.005 | < 0.005 | 9.69 |
| Strip Mall                        | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 5.89 | 17.6  | 23.5 | 0.61    | 0.01    | 43.0 |
| Total                             | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 48.8 | 156   | 205  | 5.01    | 0.12    | 366  |

|                                   |   |   |   |   |   |   |   |   |   |   |      |      |      |         |         |      |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|------|------|------|---------|---------|------|
| Daily, Winter (Max)               | — | — | — | — | — | — | — | — | — | — | —    | —    | —    | —       | —       | —    |
| Medical Office Building           | — | — | — | — | — | — | — | — | — | — | 17.4 | 52.1 | 69.5 | 1.79    | 0.04    | 127  |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | 5.10 | 15.3 | 20.4 | 0.52    | 0.01    | 37.2 |
| Junior College (2yr)              | — | — | — | — | — | — | — | — | — | — | 3.29 | 9.86 | 13.1 | 0.34    | 0.01    | 24.0 |
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | 10.4 | 31.2 | 41.5 | 1.07    | 0.03    | 75.9 |
| Apartment S Mid Rise              | — | — | — | — | — | — | — | — | — | — | 6.73 | 20.2 | 26.9 | 0.69    | 0.02    | 49.1 |
| Other Non-Asphalt Surfaces        | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Parking Lot                       | — | — | — | — | — | — | — | — | — | — | 0.00 | 9.65 | 9.65 | < 0.005 | < 0.005 | 9.69 |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | 5.89 | 17.6 | 23.5 | 0.61    | 0.01    | 43.0 |
| Total                             | — | — | — | — | — | — | — | — | — | — | 48.8 | 156  | 205  | 5.01    | 0.12    | 366  |
| Annual                            | — | — | — | — | — | — | — | — | — | — | —    | —    | —    | —       | —       | —    |
| Medical Office Building           | — | — | — | — | — | — | — | — | — | — | 2.88 | 8.62 | 11.5 | 0.30    | 0.01    | 21.0 |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | 0.85 | 2.53 | 3.38 | 0.09    | < 0.005 | 6.17 |
| Junior College (2yr)              | — | — | — | — | — | — | — | — | — | — | 0.54 | 1.63 | 2.18 | 0.06    | < 0.005 | 3.97 |



|                                   |   |   |   |   |   |   |   |   |   |   |      |      |      |         |         |      |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|------|------|------|---------|---------|------|
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | 1.72 | 5.16 | 6.88 | 0.18    | < 0.005 | 12.6 |
| Apartment s Mid Rise              | — | — | — | — | — | — | — | — | — | — | 1.11 | 3.34 | 4.45 | 0.11    | < 0.005 | 8.13 |
| Other Non-Asphalt Surfaces        | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00    | 0.00    | 0.00 |
| Parking Lot                       | — | — | — | — | — | — | — | — | — | — | 0.00 | 1.60 | 1.60 | < 0.005 | < 0.005 | 1.60 |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | 0.98 | 2.92 | 3.90 | 0.10    | < 0.005 | 7.12 |
| Total                             | — | — | — | — | — | — | — | — | — | — | 8.08 | 25.8 | 33.9 | 0.83    | 0.02    | 60.6 |

## 4.5. Waste Emissions by Land Use

### 4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use                | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4  | N2O  | CO2e  |
|-------------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|------|------|-------|
| Daily, Summer (Max)     | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —    | —    | —     |
| Medical Office Building | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 421  | 0.00  | 421  | 42.1 | 0.00 | 1,472 |
| Hotel                   | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 31.0 | 0.00  | 31.0 | 3.10 | 0.00 | 108   |
| Junior College (2yr)    | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | 24.5 | 0.00  | 24.5 | 2.45 | 0.00 | 85.8  |

|                                   |   |   |   |   |   |   |   |   |   |   |      |      |      |      |      |       |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|------|------|------|------|------|-------|
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | 212  | 0.00 | 212  | 21.2 | 0.00 | 742   |
| Apartment<br>s<br>Mid Rise        | — | — | — | — | — | — | — | — | — | — | 35.9 | 0.00 | 35.9 | 3.59 | 0.00 | 126   |
| Other<br>Non-Asphalt<br>Surfaces  | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  |
| Parking<br>Lot                    | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | 23.5 | 0.00 | 23.5 | 2.35 | 0.00 | 82.2  |
| Total                             | — | — | — | — | — | — | — | — | — | — | 748  | 0.00 | 748  | 74.7 | 0.00 | 2,616 |
| Daily,<br>Winter<br>(Max)         | — | — | — | — | — | — | — | — | — | — | —    | —    | —    | —    | —    | —     |
| Medical<br>Office<br>Building     | — | — | — | — | — | — | — | — | — | — | 421  | 0.00 | 421  | 42.1 | 0.00 | 1,472 |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | 31.0 | 0.00 | 31.0 | 3.10 | 0.00 | 108   |
| Junior<br>College<br>(2yr)        | — | — | — | — | — | — | — | — | — | — | 24.5 | 0.00 | 24.5 | 2.45 | 0.00 | 85.8  |
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | 212  | 0.00 | 212  | 21.2 | 0.00 | 742   |
| Apartment<br>s<br>Mid Rise        | — | — | — | — | — | — | — | — | — | — | 35.9 | 0.00 | 35.9 | 3.59 | 0.00 | 126   |
| Other<br>Non-Asphalt<br>Surfaces  | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  |

|                                   |   |   |   |   |   |   |   |   |   |   |      |      |      |      |      |       |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|------|------|------|------|------|-------|
| Parking Lot                       | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | 23.5 | 0.00 | 23.5 | 2.35 | 0.00 | 82.2  |
| Total                             | — | — | — | — | — | — | — | — | — | — | 748  | 0.00 | 748  | 74.7 | 0.00 | 2,616 |
| Annual                            | — | — | — | — | — | — | — | — | — | — | —    | —    | —    | —    | —    | —     |
| Medical Office Building           | — | — | — | — | — | — | — | — | — | — | 69.7 | 0.00 | 69.7 | 6.96 | 0.00 | 244   |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | 5.13 | 0.00 | 5.13 | 0.51 | 0.00 | 17.9  |
| Junior College (2yr)              | — | — | — | — | — | — | — | — | — | — | 4.06 | 0.00 | 4.06 | 0.41 | 0.00 | 14.2  |
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | 35.1 | 0.00 | 35.1 | 3.51 | 0.00 | 123   |
| Apartment s Mid Rise              | — | — | — | — | — | — | — | — | — | — | 5.94 | 0.00 | 5.94 | 0.59 | 0.00 | 20.8  |
| Other Non-Asphalt Surfaces        | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  |
| Parking Lot                       | — | — | — | — | — | — | — | — | — | — | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | 3.89 | 0.00 | 3.89 | 0.39 | 0.00 | 13.6  |
| Total                             | — | — | — | — | — | — | — | — | — | — | 124  | 0.00 | 124  | 12.4 | 0.00 | 433   |

## 4.6. Refrigerant Emissions by Land Use

### 4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|----------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
|----------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|

|                                   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Daily, Summer (Max)               | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | —    |
| Medical Office Building           | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.85 |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 156  |
| Junior College (2yr)              | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.14 |
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.57 |
| Apartment s Mid Rise              | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.55 |
| Strip Mall                        | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.26 |
| Total                             | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 161  |
| Daily, Winter (Max)               | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | —    |
| Medical Office Building           | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.85 |
| Hotel                             | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 156  |
| Junior College (2yr)              | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.14 |
| Congregate Care (Assisted Living) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.57 |



|                                                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |
|------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------|
| Apartment<br>s                                 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.55 |
| Strip Mall                                     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.26 |
| Total                                          | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 161  |
| Annual                                         | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | —    |
| Medical<br>Office<br>Building                  | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.31 |
| Hotel                                          | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 25.9 |
| Junior<br>College<br>(2yr)                     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.02 |
| Congregat<br>e<br>Care<br>(Assisted<br>Living) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.26 |
| Apartment<br>s<br>Mid Rise                     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.09 |
| Strip Mall                                     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.04 |
| Total                                          | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 26.6 |

## 4.7. Offroad Emissions By Equipment Type

### 4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipmen<br>t<br>Type     | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|---------------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
| Daily,<br>Summer<br>(Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total                     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Daily,<br>Winter<br>(Max) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total                     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual                    | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Total                     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 4.8. Stationary Emissions By Equipment Type

### 4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type            | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|---------------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
| Daily,<br>Summer<br>(Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total                     | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Daily,<br>Winter<br>(Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total                     | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Annual                    | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total                     | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |

## 4.9. User Defined Emissions By Equipment Type

### 4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Equipment Type      | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|---------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
| Daily, Summer (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Daily, Winter (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Annual              | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |

#### 4.10. Soil Carbon Accumulation By Vegetation Type

##### 4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Vegetation          | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|---------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
| Daily, Summer (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Daily, Winter (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Annual              | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |

##### 4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Land Use            | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|---------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
| Daily, Summer (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Daily, Winter (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Annual              | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Total               | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |

#### 4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

| Species             | ROG | NOx | CO | SO2 | PM10E | PM10D | PM10T | PM2.5E | PM2.5D | PM2.5T | BCO2 | NBCO2 | CO2T | CH4 | N2O | CO2e |
|---------------------|-----|-----|----|-----|-------|-------|-------|--------|--------|--------|------|-------|------|-----|-----|------|
| Daily, Summer (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Avoided             | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Subtotal            | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Sequestered         | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Subtotal            | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Removed             | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Subtotal            | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| —                   | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Daily, Winter (Max) | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Avoided             | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |
| Subtotal            | —   | —   | —  | —   | —     | —     | —     | —      | —      | —      | —    | —     | —    | —   | —   | —    |



|              |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sequester    | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed      | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| —            | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Annual       | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Avoided      | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Sequester ed | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Removed      | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Subtotal     | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| —            | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

5. Activity Data

5.1. Construction Schedule

| Phase Name            | Phase Type            | Start Date | End Date   | Days Per Week | Work Days per Phase | Phase Description |
|-----------------------|-----------------------|------------|------------|---------------|---------------------|-------------------|
| Site Preparation      | Site Preparation      | 3/4/2024   | 4/5/2024   | 5.00          | 25.0                | —                 |
| Grading               | Grading               | 4/8/2024   | 6/28/2024  | 5.00          | 60.0                | —                 |
| Building Construction | Building Construction | 7/1/2024   | 10/16/2026 | 5.00          | 600                 | —                 |
| Paving                | Paving                | 10/19/2026 | 12/25/2026 | 5.00          | 50.0                | —                 |
| Architectural Coating | Architectural Coating | 12/28/2026 | 3/5/2027   | 5.00          | 50.0                | —                 |

5.2. Off-Road Equipment

### 5.2.1. Unmitigated

| Phase Name            | Equipment Type            | Fuel Type | Engine Tier | Number per Day | Hours Per Day | Horsepower | Load Factor |
|-----------------------|---------------------------|-----------|-------------|----------------|---------------|------------|-------------|
| Site Preparation      | Rubber Tired Dozers       | Diesel    | Tier 2      | 3.00           | 8.00          | 367        | 0.40        |
| Site Preparation      | Tractors/Loaders/Backhoes | Diesel    | Tier 2      | 4.00           | 8.00          | 84.0       | 0.37        |
| Grading               | Excavators                | Diesel    | Tier 2      | 2.00           | 8.00          | 36.0       | 0.38        |
| Grading               | Graders                   | Diesel    | Tier 2      | 1.00           | 8.00          | 148        | 0.41        |
| Grading               | Rubber Tired Dozers       | Diesel    | Tier 2      | 1.00           | 8.00          | 367        | 0.40        |
| Grading               | Scrapers                  | Diesel    | Tier 2      | 2.00           | 8.00          | 423        | 0.48        |
| Grading               | Tractors/Loaders/Backhoes | Diesel    | Tier 2      | 2.00           | 8.00          | 84.0       | 0.37        |
| Building Construction | Cranes                    | Diesel    | Tier 2      | 1.00           | 7.00          | 367        | 0.29        |
| Building Construction | Forklifts                 | Diesel    | Tier 2      | 3.00           | 8.00          | 82.0       | 0.20        |
| Building Construction | Generator Sets            | Diesel    | Tier 2      | 1.00           | 8.00          | 14.0       | 0.74        |
| Building Construction | Tractors/Loaders/Backhoes | Diesel    | Tier 2      | 3.00           | 7.00          | 84.0       | 0.37        |
| Building Construction | Welders                   | Diesel    | Tier 2      | 1.00           | 8.00          | 46.0       | 0.45        |
| Paving                | Pavers                    | Diesel    | Tier 2      | 2.00           | 8.00          | 81.0       | 0.42        |
| Paving                | Paving Equipment          | Diesel    | Tier 2      | 2.00           | 8.00          | 89.0       | 0.36        |
| Paving                | Rollers                   | Diesel    | Tier 2      | 2.00           | 8.00          | 36.0       | 0.38        |
| Architectural Coating | Air Compressors           | Diesel    | Tier 2      | 1.00           | 6.00          | 37.0       | 0.48        |

### 5.3. Construction Vehicles

#### 5.3.1. Unmitigated

| Phase Name       | Trip Type | One-Way Trips per Day | Miles per Trip | Vehicle Mix   |
|------------------|-----------|-----------------------|----------------|---------------|
| Site Preparation | —         | —                     | —              | —             |
| Site Preparation | Worker    | 17.5                  | 10.6           | LDA,LDT1,LDT2 |

|                       |              |      |      |               |
|-----------------------|--------------|------|------|---------------|
| Site Preparation      | Vendor       | —    | 3.50 | HHDT,MHDT     |
| Site Preparation      | Hauling      | 0.00 | 20.0 | HHDT          |
| Site Preparation      | Onsite truck | —    | —    | HHDT          |
| Grading               | —            | —    | —    | —             |
| Grading               | Worker       | 20.0 | 10.6 | LDA,LDT1,LDT2 |
| Grading               | Vendor       | —    | 3.50 | HHDT,MHDT     |
| Grading               | Hauling      | 125  | 20.0 | HHDT          |
| Grading               | Onsite truck | —    | —    | HHDT          |
| Building Construction | —            | —    | —    | —             |
| Building Construction | Worker       | 258  | 10.6 | LDA,LDT1,LDT2 |
| Building Construction | Vendor       | 65.3 | 3.50 | HHDT,MHDT     |
| Building Construction | Hauling      | 0.00 | 20.0 | HHDT          |
| Building Construction | Onsite truck | —    | —    | HHDT          |
| Paving                | —            | —    | —    | —             |
| Paving                | Worker       | 15.0 | 10.6 | LDA,LDT1,LDT2 |
| Paving                | Vendor       | —    | 3.50 | HHDT,MHDT     |
| Paving                | Hauling      | 0.00 | 20.0 | HHDT          |
| Paving                | Onsite truck | —    | —    | HHDT          |
| Architectural Coating | —            | —    | —    | —             |
| Architectural Coating | Worker       | 51.6 | 10.6 | LDA,LDT1,LDT2 |
| Architectural Coating | Vendor       | —    | 3.50 | HHDT,MHDT     |
| Architectural Coating | Hauling      | 0.00 | 20.0 | HHDT          |
| Architectural Coating | Onsite truck | —    | —    | HHDT          |

## 5.4. Vehicles

### 5.4.1. Construction Vehicle Control Strategies

| Control Strategies Applied                      | PM10 Reduction | PM2.5 Reduction |
|-------------------------------------------------|----------------|-----------------|
| Water unpaved roads twice daily                 | 55%            | 55%             |
| Limit vehicle speeds on unpaved roads to 25 mph | 44%            | 44%             |
| Sweep paved roads once per month                | 9%             | 9%              |

## 5.5. Architectural Coatings

| Phase Name            | Residential Interior Area Coated (sq ft) | Residential Exterior Area Coated (sq ft) | Non-Residential Interior Area Coated (sq ft) | Non-Residential Exterior Area Coated (sq ft) | Parking Area Coated (sq ft) |
|-----------------------|------------------------------------------|------------------------------------------|----------------------------------------------|----------------------------------------------|-----------------------------|
| Architectural Coating | 404,941                                  | 134,980                                  | 373,208                                      | 124,403                                      | 56,558                      |

## 5.6. Dust Mitigation

### 5.6.1. Construction Earthmoving Activities

| Phase Name       | Material Imported (cy) | Material Exported (cy) | Acres Graded (acres) | Material Demolished (sq. ft.) | Acres Paved (acres) |
|------------------|------------------------|------------------------|----------------------|-------------------------------|---------------------|
| Site Preparation | —                      | —                      | 37.5                 | 0.00                          | —                   |
| Grading          | —                      | 60,000                 | 180                  | 0.00                          | —                   |
| Paving           | 0.00                   | 0.00                   | 0.00                 | 0.00                          | 21.6                |

### 5.6.2. Construction Earthmoving Control Strategies

| Control Strategies Applied | Frequency (per day) | PM10 Reduction | PM2.5 Reduction |
|----------------------------|---------------------|----------------|-----------------|
| Water Exposed Area         | 2                   | 61%            | 61%             |

## 5.7. Construction Paving

| Land Use                | Area Paved (acres) | % Asphalt |
|-------------------------|--------------------|-----------|
| Medical Office Building | 0.00               | 0%        |
| Hotel                   | 0.00               | 0%        |



|                                   |      |      |
|-----------------------------------|------|------|
| Junior College (2yr)              | 0.00 | 0%   |
| Congregate Care (Assisted Living) | —    | 0%   |
| Apartments Mid Rise               | —    | 0%   |
| Other Non-Asphalt Surfaces        | 6.00 | 0%   |
| Parking Lot                       | 15.6 | 100% |
| Strip Mall                        | 0.00 | 0%   |

## 5.8. Construction Electricity Consumption and Emissions Factors

### kWh per Year and Emission Factor (lb/MWh)

| Year | kWh per Year | CO2 | CH4  | N2O     |
|------|--------------|-----|------|---------|
| 2024 | 0.00         | 532 | 0.03 | < 0.005 |
| 2025 | 0.00         | 532 | 0.03 | < 0.005 |
| 2026 | 0.00         | 532 | 0.03 | < 0.005 |
| 2027 | 0.00         | 532 | 0.03 | < 0.005 |

## 5.9. Operational Mobile Sources

### 5.9.1. Unmitigated

| Land Use Type                     | Trips/Weekday | Trips/Saturday | Trips/Sunday | Trips/Year | VM/Weekday | VM/Saturday | VM/Sunday | VM/Year   |
|-----------------------------------|---------------|----------------|--------------|------------|------------|-------------|-----------|-----------|
| Medical Office Building           | 1,393         | 1,393          | 1,393        | 508,561    | 5,447      | 5,447       | 5,447     | 1,988,040 |
| Hotel                             | 683           | 683            | 683          | 249,113    | 2,668      | 2,668       | 2,668     | 973,818   |
| Junior College (2yr)              | 638           | 638            | 638          | 232,888    | 2,494      | 2,494       | 2,494     | 910,395   |
| Congregate Care (Assisted Living) | 663           | 663            | 663          | 242,006    | 3,069      | 3,069       | 3,069     | 1,120,102 |
| Apartments Mid Rise               | 576           | 576            | 576          | 210,240    | 2,666      | 2,666       | 2,666     | 973,076   |
| Other Non-Asphalt Surfaces        | 0.00          | 0.00           | 0.00         | 0.00       | 0.00       | 0.00        | 0.00      | 0.00      |

|             |       |       |       |         |       |       |       |           |
|-------------|-------|-------|-------|---------|-------|-------|-------|-----------|
| Parking Lot | 0.00  | 0.00  | 0.00  | 0.00    | 0.00  | 0.00  | 0.00  | 0.00      |
| Strip Mall  | 1,287 | 1,287 | 1,287 | 469,573 | 5,029 | 5,029 | 5,029 | 1,835,629 |

## 5.10. Operational Area Sources

### 5.10.1. Hearths

#### 5.10.1.1. Unmitigated

| Hearth Type                       | Unmitigated (number) |
|-----------------------------------|----------------------|
| Congregate Care (Assisted Living) | —                    |
| Wood Fireplaces                   | 0                    |
| Gas Fireplaces                    | 70                   |
| Propane Fireplaces                | 0                    |
| Electric Fireplaces               | 0                    |
| No Fireplaces                     | 70                   |
| Conventional Wood Stoves          | 0                    |
| Catalytic Wood Stoves             | 7                    |
| Non-Catalytic Wood Stoves         | 7                    |
| Pellet Wood Stoves                | 0                    |
| Apartments Mid Rise               | —                    |
| Wood Fireplaces                   | 0                    |
| Gas Fireplaces                    | 45                   |
| Propane Fireplaces                | 0                    |
| Electric Fireplaces               | 0                    |
| No Fireplaces                     | 45                   |
| Conventional Wood Stoves          | 0                    |
| Catalytic Wood Stoves             | 5                    |
| Non-Catalytic Wood Stoves         | 5                    |

|                    |   |
|--------------------|---|
| Pellet Wood Stoves | 0 |
|--------------------|---|

### 5.10.2. Architectural Coatings

| Residential Interior Area Coated (sq ft) | Residential Exterior Area Coated (sq ft) | Non-Residential Interior Area Coated (sq ft) | Non-Residential Exterior Area Coated (sq ft) | Parking Area Coated (sq ft) |
|------------------------------------------|------------------------------------------|----------------------------------------------|----------------------------------------------|-----------------------------|
| 404941.27499999997                       | 134,980                                  | 373,208                                      | 124,403                                      | 56,558                      |

### 5.10.3. Landscape Equipment

| Season      | Unit   | Value |
|-------------|--------|-------|
| Snow Days   | day/yr | 0.00  |
| Summer Days | day/yr | 180   |

## 5.11. Operational Energy Consumption

### 5.11.1. Unmitigated

#### Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

| Land Use                          | Electricity (kWh/yr) | CO2 | CH4    | N2O    | Natural Gas (kBTU/yr) |
|-----------------------------------|----------------------|-----|--------|--------|-----------------------|
| Medical Office Building           | 1,395,423            | 532 | 0.0330 | 0.0040 | 2,657,190             |
| Hotel                             | 1,403,506            | 532 | 0.0330 | 0.0040 | 3,016,789             |
| Junior College (2yr)              | 365,853              | 532 | 0.0330 | 0.0040 | 1,564,872             |
| Congregate Care (Assisted Living) | 701,757              | 532 | 0.0330 | 0.0040 | 2,499,095             |
| Apartments Mid Rise               | 454,375              | 532 | 0.0330 | 0.0040 | 1,618,119             |
| Other Non-Asphalt Surfaces        | 0.00                 | 532 | 0.0330 | 0.0040 | 0.00                  |
| Parking Lot                       | 596,800              | 532 | 0.0330 | 0.0040 | 0.00                  |
| Strip Mall                        | 427,442              | 532 | 0.0330 | 0.0040 | 250,756               |

## 5.12. Operational Water and Wastewater Consumption

### 5.12.1. Unmitigated

| Land Use                          | Indoor Water (gal/year) | Outdoor Water (gal/year) |
|-----------------------------------|-------------------------|--------------------------|
| Medical Office Building           | 9,072,870               | 0.00                     |
| Hotel                             | 2,663,511               | 0.00                     |
| Junior College (2yr)              | 1,716,716               | 0.00                     |
| Congregate Care (Assisted Living) | 5,426,108               | 0.00                     |
| Apartments Mid Rise               | 3,513,308               | 0.00                     |
| Other Non-Asphalt Surfaces        | 0.00                    | 0.00                     |
| Parking Lot                       | 0.00                    | 2,737,629                |
| Strip Mall                        | 3,074,010               | 0.00                     |

## 5.13. Operational Waste Generation

### 5.13.1. Unmitigated

| Land Use                          | Waste (ton/year) | Cogeneration (kWh/year) |
|-----------------------------------|------------------|-------------------------|
| Medical Office Building           | 781              | 0.00                    |
| Hotel                             | 57.5             | 0.00                    |
| Junior College (2yr)              | 45.5             | 0.00                    |
| Congregate Care (Assisted Living) | 127              | 0.00                    |
| Apartments Mid Rise               | 21.5             | 0.00                    |
| Other Non-Asphalt Surfaces        | 0.00             | 0.00                    |
| Parking Lot                       | 0.00             | 0.00                    |
| Strip Mall                        | 43.6             | 0.00                    |



## 5.14. Operational Refrigeration and Air Conditioning Equipment

### 5.14.1. Unmitigated

| Land Use Type                     | Equipment Type                                          | Refrigerant | GWP   | Quantity (kg) | Operations Leak Rate | Service Leak Rate | Times Serviced |
|-----------------------------------|---------------------------------------------------------|-------------|-------|---------------|----------------------|-------------------|----------------|
| Medical Office Building           | Household refrigerators and/or freezers                 | R-134a      | 1,430 | 0.45          | 0.60                 | 0.00              | 1.00           |
| Medical Office Building           | Other commercial A/C and heat pumps                     | R-410A      | 2,088 | < 0.005       | 4.00                 | 4.00              | 18.0           |
| Hotel                             | Household refrigerators and/or freezers                 | R-134a      | 1,430 | 0.00          | 0.60                 | 0.00              | 1.00           |
| Hotel                             | Other commercial A/C and heat pumps                     | R-410A      | 2,088 | 1.80          | 4.00                 | 4.00              | 18.0           |
| Hotel                             | Walk-in refrigerators and freezers                      | R-404A      | 3,922 | < 0.005       | 7.50                 | 7.50              | 20.0           |
| Junior College (2yr)              | Household refrigerators and/or freezers                 | R-134a      | 1,430 | 0.02          | 0.60                 | 0.00              | 1.00           |
| Junior College (2yr)              | Other commercial A/C and heat pumps                     | R-410A      | 2,088 | < 0.005       | 4.00                 | 4.00              | 18.0           |
| Junior College (2yr)              | Stand-alone retail refrigerators and freezers           | R-134a      | 1,430 | < 0.005       | 1.00                 | 0.00              | 1.00           |
| Junior College (2yr)              | Walk-in refrigerators and freezers                      | R-404A      | 3,922 | < 0.005       | 7.50                 | 7.50              | 20.0           |
| Congregate Care (Assisted Living) | Average room A/C & Other residential A/C and heat pumps | R-410A      | 2,088 | < 0.005       | 2.50                 | 2.50              | 10.0           |
| Congregate Care (Assisted Living) | Household refrigerators and/or freezers                 | R-134a      | 1,430 | 0.22          | 0.60                 | 0.00              | 1.00           |
| Apartments Mid Rise               | Average room A/C & Other residential A/C and heat pumps | R-410A      | 2,088 | < 0.005       | 2.50                 | 2.50              | 10.0           |
| Apartments Mid Rise               | Household refrigerators and/or freezers                 | R-134a      | 1,430 | 0.12          | 0.60                 | 0.00              | 1.00           |

|            |                                               |        |       |         |      |      |      |
|------------|-----------------------------------------------|--------|-------|---------|------|------|------|
| Strip Mall | Other commercial A/C and heat pumps           | R-410A | 2,088 | < 0.005 | 4.00 | 4.00 | 18.0 |
| Strip Mall | Stand-alone retail refrigerators and freezers | R-134a | 1,430 | 0.04    | 1.00 | 0.00 | 1.00 |
| Strip Mall | Walk-in refrigerators and freezers            | R-404A | 3,922 | < 0.005 | 7.50 | 7.50 | 20.0 |

## 5.15. Operational Off-Road Equipment

### 5.15.1. Unmitigated

| Equipment Type | Fuel Type | Engine Tier | Number per Day | Hours Per Day | Horsepower | Load Factor |
|----------------|-----------|-------------|----------------|---------------|------------|-------------|
|----------------|-----------|-------------|----------------|---------------|------------|-------------|

## 5.16. Stationary Sources

### 5.16.1. Emergency Generators and Fire Pumps

| Equipment Type | Fuel Type | Number per Day | Hours per Day | Hours per Year | Horsepower | Load Factor |
|----------------|-----------|----------------|---------------|----------------|------------|-------------|
|----------------|-----------|----------------|---------------|----------------|------------|-------------|

### 5.16.2. Process Boilers

| Equipment Type | Fuel Type | Number | Boiler Rating (MMBtu/hr) | Daily Heat Input (MMBtu/day) | Annual Heat Input (MMBtu/yr) |
|----------------|-----------|--------|--------------------------|------------------------------|------------------------------|
|----------------|-----------|--------|--------------------------|------------------------------|------------------------------|

## 5.17. User Defined

| Equipment Type | Fuel Type |
|----------------|-----------|
| —              | —         |

## 5.18. Vegetation

### 5.18.1. Land Use Change

5.18.1.1. Unmitigated

| Vegetation Land Use Type | Vegetation Soil Type | Initial Acres | Final Acres |
|--------------------------|----------------------|---------------|-------------|
|--------------------------|----------------------|---------------|-------------|

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

| Biomass Cover Type | Initial Acres | Final Acres |
|--------------------|---------------|-------------|
|--------------------|---------------|-------------|

5.18.2. Sequestration

5.18.2.1. Unmitigated

| Tree Type | Number | Electricity Saved (kWh/year) | Natural Gas Saved (btu/year) |
|-----------|--------|------------------------------|------------------------------|
|-----------|--------|------------------------------|------------------------------|

8. User Changes to Default Data

| Screen                                    | Justification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land Use                                  | Medical Office Building includes: a 22,525-square-foot ambulatory surgery center; a 12,445-square-foot specialty clinic; two 12,445-square-foot medical office buildings; and a 12,445-square-foot psychiatric health facility. Strip Mall includes 41,500 square feet of medical/commercial uses. Hotel includes a 100,000-square-foot, a four-story 105-room hotel with a conference center. Junior College includes a 35,000-square-foot nursing college. Congregate Care (Assisted Living) includes; a 54,611-square-foot skilled nursing facility; a 34,480-square-foot memory care facility; and a 34,380-square-foot assisted living facility. Mid-rise Apartment includes a three-story 90-unit multi-family apartment. Total project acreage is 39.23 acres. Assuming 10% of the project site would be landscaped. |
| Construction: Construction Phases         | Construction is anticipated to begin March 2024 and last approximately 3 years.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Construction: Off-Road Equipment          | Assuming the use of Tier 2 construction equipment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Construction: Dust From Material Movement | Over excavation would be between 30,000 and 60,000 cubic yards of soil; therefore, this analysis assumes up to 60,000 cubic yards of export.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                          |                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operations: Vehicle Data | Assuming approximately 1,393 average daily trips (ADT) for the Medical Office Building land uses, 682 ADT for the hotel use, 638 ADT for the nursing college, 662 ADT for the assisted living uses, 576 ADT for the apartments, and 1,287 ADT for the Strip Mapp land uses based on the project's trip generation and taking into account 10% internal trips. |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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## APPENDIX B

# BIOLOGICAL RESOURCES ASSESSMENT



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# BIOLOGICAL RESOURCES ASSESSMENT

## HANFORD PLACE PROJECT CITY OF HANFORD, CALIFORNIA



LSA

June 2021

# **BIOLOGICAL RESOURCES ASSESSMENT**

## **HANFORD PLACE PROJECT CITY OF HANFORD, CALIFORNIA**

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LSA Project No. EPI2001



June 2021

## EXECUTIVE SUMMARY

LSA Associates, Inc. (LSA) prepared this biological resources assessment for the proposed Hanford Place Project (project) located between State Route 198 and the San Joaquin Valley Railroad in the City of Hanford, Kings County, California. The project consists of a medical and mixed-use development spanning approximately 40 acres. A total of 15 buildings are proposed, including medical outpatient clinic services, hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as an infiltration basin, associated open space, circulation and parking, and infrastructure improvements. The project site was historically used for agricultural but has remained fallow for many years. The site is located on the margin of urban portions of the City of Hanford with no connection to undisturbed or natural lands.

In March 2020, LSA biologists conducted a literature review and records search to identify the existence and potential for occurrence of sensitive or special-status plant and animal species in the vicinity of the project site. Federal and state lists of sensitive species were also examined. Current electronic database records reviewed included the California Natural Diversity Database, California Native Plant Society's Electronic Inventory of Rare and Endangered Vascular Plants, and United States Fish and Wildlife Service's National Wetlands Inventory. Historic and current aerial imagery, existing environmental reports for developments in the project vicinity, regional habitat conservation plans, and local land use policies related to biological resources were also reviewed. A field survey covering the project site was conducted on April 27, 2020.

With the exception of the Peoples Ditch, the project site is strictly upland in nature with well-drained soils and vegetation consisting of nonnative grassland with patches of mixed herbaceous ruderal/invasive species and bare ground in several areas. Ongoing soil disturbance and the resulting competitive exclusion by invasive nonnative plants limit the potential for native flora to occur in the project site. No native or special-status vegetation communities exist on the project site. No special-status plant species were observed during the field survey and none are expected to occur due to historical and ongoing anthropogenic disturbances.

Habitat in the project site is considered low quality with respect to most of the regionally-occurring special-status animal species, and no special-status species were observed during the field survey. However, two special-status animal species—San Joaquin kit fox (*Vulpes macrotis mutica*) and burrowing owl (*Athene cunicularia*)—have at least a low potential to occur in the project site due to the presence of suitable habitat and known occurrence records in the project vicinity. The project site also contains foraging habitat for certain raptors such as Swainson's hawk (*Buteo swainsoni*) but suitable tree-nesting habitat is generally absent from the project site. Suitable avian nesting habitat on the project site is limited to that which supports ground-nesting species such as Savannah sparrow (*Passerculus sandwichensis*) and other birds that may nest in the annual herbaceous cover.

With the implementation of recommended impact avoidance, minimization, and mitigation measures—including pre-construction surveys and compliance with applicable regulatory requirements—there would be no significant impacts to special-status biological resources resulting from the project.

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## ATTACHMENTS

Appendix A (Figures), Appendix B (Plant Species Observed), Appendix C (Representative Site Photos), Appendix D (Regional Special-Status Species)



## INTRODUCTION

LSA has prepared this Biological Resources Assessment for the proposed Hanford Place Project (project) located between State Route 198 and the San Joaquin Valley Railroad in the City of Hanford (City), Kings County, California (refer to Figure 1, Project Location; all figures are provided in Appendix A). The purpose of this report is to describe and document biological resources—including sensitive and special-status species—known to occur or with the potential to occur on the proposed project site. This technical information is provided for project planning purposes and review under the California Environmental Quality Act (CEQA), California Endangered Species Act (CESA), the Federal Endangered Species Act (FESA), and other pertinent regulations.

The Biological Resources Assessment conducted for the project involved the following components:

- Reviewing existing relevant scientific literature and other pertinent information related to the survey area;
- Creating a list of regionally occurring special-status species determined to have the potential to occur on or in the vicinity of the project site;
- Characterizing the vegetation communities present within the survey area;
- Evaluating the potential for the occurrence of special-status plant and wildlife species within the survey area;
- Assessing the potential for the project to adversely impact existing biological resources; and
- Recommending avoidance, minimization, and mitigation measures to avoid or minimize any potentially significant project-related impacts to biological resources.

## PROJECT DESCRIPTION

The project involves a medical and mixed use development consisting of medical facility, skilled nursing, assisted living, retail and multi-family units on approximately 40 acres of vacant land located between State Route 198 and the San Joaquin Valley Railroad in the City of Hanford (Figure 2). Once constructed, and extension of 5th Street would run through the project site in an east/west direction and Campus Drive would be extended south into the site, with a roundabout constructed near the center portion of the site. Proposed road extensions and improvements would be dedicated as public right of way. As part of the project, Glendale Avenue would also be realigned and any portion of existing right of way not used would be abandoned. In addition, an open segment of Peoples Ditch (a constructed irrigation canal) that currently runs through the project site would be converted to an underground culvert.

The General Plan and zoning designation for the project site is currently Highway Commercial (C-H). The project would amend the General Plan and require a rezone to a combination of Office, Medium- or High-Density Residential and Regional or Highway Commercial.

The project would include the following: a 22,525-square-foot ambulatory surgery center; a 12,445-square-foot specialty clinic; two 12,445-square-foot medical office buildings; a 12,445-square-foot psychiatric health facility; a 10,000-square-foot, a four-story 105-room hotel with a conference

center and pool; a 35,000-square-foot nursing college; four 15,55-square-foot strip retail buildings; two 15,000-square-foot retail/drive-through/medical commercial buildings; a 54,611-square-foot skilled nursing facility; a 34,480-square-foot memory care facility; a three-story 90-unit multi-family apartment; two 11,000 medical/commercial buildings; and a 5-acre bio infiltration basin. In addition, the project would provide 1,466 parking spaces throughout the project site. Figure 3 shows the project site plan.

Regional access to the site is provided by State Route 198, which borders the southern portion of the project site and is located approximately 0.5 miles from the project site entrance. Site access would be provided by one main driveway along Campus Drive, as well as Fifth Street on the east side of the project site that would extend on the existing street alignment. The project would not require any work within undeveloped lands outside of the approximately 40-acre project site.

## PROJECT SETTING

The project site is located along the south central portion of the San Joaquin Valley floor in the Kings County. Specifically, the project site is located on four legal parcels (Assessor's Parcel Numbers 012-290-042, 012-290-054, 011-060-007, and 011-060-080) in the northeastern quarter of the United States Geological Survey (USGS) *Hanford, California*, 7.5-minute topographic quadrangle map (refer to Figure 1). The "project site" discussed in this report refers to all areas within the four legal parcels described above (totaling approximately 40 acres) and includes all areas where temporary and permanent ground disturbance would occur.

The project site is currently fallow and disturbed with no existing structures (Figure 2). The site was previously used for agriculture, consistent with many of the surrounding lands in the region. According to historic aerial imagery, the project site has remained in its current condition for more than 20 years. Adjacent parcels consist mostly of low-density residential and commercial developments, with several undeveloped lots located to the north of the project site. Recent developments along the margins of the City of Hanford and expansion into ranch land settlements have brought increased urban development throughout lands previously used for agriculture. Some lands in the vicinity of the project site are fallow or active agricultural lands; however, most of the lands are developed and are a mixture of school, residential, commercial, retail, and industrial uses. There are no undisturbed open spaces in the vicinity of the project site.

The project site is located within the San Joaquin Valley Sub-region of the California Floristic Province (Baldwin, et al. 2012) and within the Sand Slough watershed (Hydrologic Unit Code #180300122002). The project site is flat with almost no topographic variation and is at approximately 228 feet (69 meters) above mean sea level in elevation. An open segment of Peoples Ditch (a constructed irrigation canal) is located within the project site, but there are no natural drainage features or riparian areas present in the project site. Extensive soil disturbance from foot traffic and vehicles is evident throughout the site, and the site appears to be regularly disked for vegetation control. Several homeless encampments were present in multiple portions of the project site during the April 2020 site survey.

## METHODS

### LITERATURE REVIEW AND RECORDS SEARCH

LSA Biologist Kelly McDonald conducted a literature review and records search on March 31, 2020, to identify the existence and potential for occurrence of sensitive or special-status<sup>1</sup> plant and animal species in the vicinity of the project site. Federal and State lists of sensitive species were also examined. Current electronic database records reviewed included the following:

- **California Natural Diversity Data Base information (CNDDB – RareFind 5)**, which is administered by the California Department of Fish and Wildlife (CDFW), formerly known as the California Department of Fish and Game (CDFG). This database covers sensitive plant and animal species as well as sensitive natural communities that occur in California. Records from nine USGS quadrangles surrounding the project site (*Riverdale, Laton, Burris Park, Lemoore, Hanford, Remnoy, Stratford, Guernsey, and Waukena*) were obtained from this database to inform the field survey.
- **California Native Plant Society’s (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants**, which utilizes four specific categories or “lists” of sensitive plant species to assist with the conservation of rare or endangered botanical resources. All of the plants constituting California Rare Plant Ranks 1A, 1B, 2A, and 2B are intended to meet the status definitions of “threatened” or “endangered” in CESA and the California Department of Fish and Game Code, and are considered by CNPS to be eligible for State listing. At the discretion of the CEQA Lead Agency, impacts to these species may be analyzed as such, pursuant to the CEQA Guidelines Sections 15125(c) and 15380. Plants in Rank 3 (limited information; review list), Rank 4 (limited distribution; watch list), or that are considered Locally Unusual and Significant may be analyzed under CEQA if there is sufficient information to assess potential significant impacts. Records from the nine USGS quadrangles surrounding the project site were obtained from this database to inform the field survey.
- **United States Fish and Wildlife Service’s (USFWS) Information for Planning and Conservation (IPaC) Online System**, which lists all proposed, candidate, threatened, and endangered species managed by the Endangered Species Program of the USFWS that have the potential to occur on or near a particular site. This database also lists all known critical habitats, national wildlife refuges, and migratory birds that could potentially be impacted by activities from a proposed project. An IPaC Trust Resource Report (USFWS 2020a) was generated for the project area.

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<sup>1</sup> For the purposes of this report, the term “special-status species” refers to those species that are listed or proposed for listing under the CESA and/or FESA, California Fully Protected Species, California Species of Special Concern, and California Special Animals. It should be noted that “Species of Special Concern” and “California Special Animal” are administrative designations made by the CDFW and carry no formal legal protection status. However, Section 15380 of the CEQA Guidelines indicates that these species should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein.

- **Designated and Proposed USFWS Critical Habitat Polygons** were reviewed to determine whether critical habitat has been designated or proposed within or in the vicinity of the project site (USFWS 2020b).
- **The USFWS National Wetlands Inventory** was reviewed to determine whether any wetlands or surface waters of the United States have been previously-identified in the survey area (USFWS 2020c).
- **eBird:** eBird is a real-time, online checklist program launched in 2002 by the Cornell Lab of Ornithology and National Audubon Society. It provides rich data sources for basic information on bird abundance and distribution at a variety of spatial and temporal scales. eBird occurrence records for burrowing owl (*Athene cunicularia*) from a 5 mile radius around the project site were reviewed in May 2020 (eBird 2020).

In addition to the databases listed above, historic and current aerial imagery, existing environmental reports for developments in the project vicinity, and local land use policies related to biological resources were reviewed.

## FIELD SURVEY

A general biological survey of the project site was conducted by LSA Biologist Kelly McDonald on April 27, 2020. The project site was surveyed on foot, and all biological resources observed were noted and mapped. Suitable habitat for any species of interest or concern was duly noted, and general site conditions were photographed (Appendix C, Site Photos). The field survey took place on a clear sunny morning with weather conditions conducive to the detection of plant and animal species.

## RESULTS

This section summarizes the environmental setting and provides further analysis of the data collected in the field. Discussions regarding the existing project site conditions, soils, vegetation communities, potentially occurring special-status biological resources, and habitat connectivity are presented below.

The project site consists of flat, undeveloped parcels supporting nonnative grassland and other invasive plant species. Ruderal and nonnative grassland vegetation existing on the site appears to be regularly maintained. There is one tree, tree of heaven (*Ailanthus altissima*; a nonnative species), within the project site. Much of the soil and vegetation within the project site is disturbed from existing roadways in the immediate vicinity, off-highway vehicles, homeless encampment, and human foot traffic. Worn foot paths, litter, and trampling are evident throughout the project site.

Habitat within the project site is considered low quality with respect to most of the special-status animal species identified during the literature review and the project site is not expected to support any special-status plant species (refer to Appendix D). Wildlife species observed during the April 2020 field survey include: rock pigeon (*Columba livia*; nonnative species), Savannah sparrow (*Passerculus sandwichensis*), western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaidura macroura*), double-crested cormorant (*Phalacrocorax auritus*), common raven (*Corvus corax*), red-tailed hawk (*Buteo jamaicensis*), European starling (*Sturnus vulgaris*; nonnative species), western fence lizard (*Sceloporus occidentalis*), Sierran tree frog (*Pseudacris sierra*), California toad (*Anaxyrus boreas halophilus*; tadpoles) and California ground squirrel (*Otospermophilus beecheyi*).

No riparian habitat exists in the project site or on adjacent parcels and there are no depressional wetlands (e.g., vernal pools) or natural drainage features within the project site. The project site does not serve as a wildlife nursery or as a wildlife migration corridor. Further details regarding specific biological resources are provided in the following subsections.

### VEGETATION COMMUNITIES AND LAND COVER TYPES

With the exception of an open portion of Peoples Ditch (an irrigation canal excavated in the late 1800's), the project site is strictly upland in nature with dominant vegetation consisting of nonnative grassland with patches of mixed herbaceous ruderal/invasive species. Ongoing soil disturbance and the resulting competitive exclusion by invasive nonnative plants limit the potential for native flora to occur in the project site. No native or special-status vegetation communities exist in the project site.

The identification and characterizations of vegetation communities generally follow the plant community descriptions in the Manual of California Vegetation (Sawyer et al. 2009). Anthropogenic areas are those areas that have been converted from their natural habitat to ones that are subject to ongoing human maintenance and disturbance; these areas include roads, road shoulders, and areas that are disturbed or maintained. The acreages of each vegetation community and land cover type occurring in the project site are shown in Table A, below. Representative photographs of the



project site are presented in Appendix C, and Figure 4 provides a map of these vegetation and land cover types within the project site.

**Table A: Vegetation and Land Cover Types Within the Project site**

| Vegetation / Land Cover Type          | Acreage <sup>1</sup> |
|---------------------------------------|----------------------|
| Wild oats and annual brome grasslands | 38.51                |
| Developed                             | 0.17                 |
| Disturbed / Barren                    | 1.10                 |
| Peoples Ditch – Irrigation Canal      | 0.51                 |
| <b>Total</b>                          | <b>40.29</b>         |

<sup>1</sup> All acreages were calculated using geographic information system (GIS) measurements and are considered approximate.

A total of 36 vascular plant species were identified within the project site during the April 2020 field survey (refer to Appendix B). A total of 27 of these plant species (75 percent) represent nonnative taxa, reflecting a high level of disturbance within the project site.

#### **Wild oats and annual brome grassland (*Avena* spp. - *Bromus* spp. Herbaceous Semi-Natural Alliance)**

Disturbed nonnative wild oats and annual brome grassland comprises the majority of the project site. Wild oats and annual brome grasslands are often found in foothills, waste places, rangelands, and opening in woodlands. This alliance is dominated by invasive/pioneering nonnative grasses including slender oats (*Avena barbata*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), barely grasses (*Hordeum* spp), along with other nonnative/ruderal plant species such as Russian thistle (*Salsola tragus*). Less prevalent species at the time of survey included London rocket (*Sisymbrium irio*), cheeseweed mallow (*Malva parviflora*) and Mediterranean storks' bill (*Erodium malacoides*).

The dominance of these nonnative weedy species is indicative of historical and recent soil disturbance. Native perennial shrubs are entirely absent from the project site, and the site appears to be regularly maintained.

Large tracts of annual grassland habitat provide foraging and/or breeding habitat for many wildlife species. Vacant lots in the vicinity of the project site provide suitable habitat for numerous invertebrate species (such as insects), many of which provide a food source for animals such as lizards, birds, and small mammals, which in turn serve as a prey base for larger predator animals, including snakes, raptors, and coyotes. Due to the extensive weed coverage of the wild oats and annual brome grassland within the project site, it is not expected to provide high-quality foraging or nesting habitat for many special-status wildlife species known to occur in the region.

#### **Disturbed / Barren**

Based on an analysis of historical aerial imagery and observations during the April 2020 site survey, vehicles regularly park and drive across portions of the site, specifically along the project site perimeter. Portions of the central survey area also appeared to be disturbed by off-highway vehicles (as evinced by tire tracks, ruts, etc.). These disturbed areas lacked vegetation or supported a sparse

cover of ruderal vegetation, with annual nonnative grasses and Russian thistle being the most frequently encountered plant species. Several other invasive, pioneering plant species were also observed in these areas.

### Developed

Developed sites consist of paved areas, buildings, and other areas that are cleared or graded for anthropogenic purposes. A small portion (0.17 acre) of the project site contains an existing paved road which is mapped as developed.

### SOILS

According to the NRCS online soil survey of Kings County, the project site is primarily composed of Nord complex soils (99.3%) and the remaining are urban land (Figure 5). The Nord complex soil classification is discussed in greater detail below.

#### Nord complex, 0 to 2 Percent Slopes, MLRA 17

The parent material of this soil type is alluvium derived from igneous rock, occurring between 58 and 183 m in elevation. The drainage class of this soil type is well drained, and it is typically composed of fine sandy loam and stratified sandy loam to loam. Nord complex usually occurs on alluvial fans, and is used for growing irrigated field, forage, and row crops. When not irrigated, vegetation is typically annual grasses and forbs.

### SPECIAL-STATUS BIOLOGICAL RESOURCES

The Hanford region supports various special-status natural communities, plants, and animals. Appendix D provides tables that identify those special-status plant and animal species known to occur or that potentially occur in the vicinity of the project site (based on the literature review and experience in the region) and includes detailed information about each species' habitat and distribution, State and Federal status designations, and probability of occurrence within the project site. As stated in the methodology section above, the background research included occurrence records from nine USGS topographic quadrangles surrounding the survey area. A nine USGS quadrangle search covers a large, variable geographic and topographic area containing numerous habitat types not found within or around the project site.

The following subsections provide specific discussions for special-status natural communities, plant and animal species, and habitats of concern (including critical habitat, jurisdictional aquatic resources, wildlife movement corridors, and regional and local habitat conservation plans).

#### Special-Status Natural Communities

The CNDDDB search identified occurrences of two special-status natural (i.e., plant) communities within the nine-quad search area: Valley Sacaton Grassland and Valley Sink Scrub.

No special-status natural communities or conservation areas exist within the project site or in adjacent parcels. The project site is completely isolated and distant from all special-status natural communities that occur in the region.

## Special-Status Plants

The literature review identified eight special-status plant species that are known to occur within a nine-quad radius of the project site (refer to Appendix D). The majority of the rare plant species that were identified in the databases have specialized habitat requirements (i.e., they occur on predominantly alkaline soils, woodland, riparian, or wetland habitats, etc.) that do not occur within the project site.

Historic anthropogenic disturbances have greatly altered the natural hydrologic regimes and have either eliminated or greatly impacted the pre-settlement habitats needed to support the special-status plant species identified in the CNDDDB and CNPS queries. As such, the specific habitats, soil substrates or “micro-climates” necessary for special-status plant species to occur are absent within the boundaries of the project site. Based on site observations coupled with the habitat suitability analysis, no special-status plant species are expected to occur within the project site. It is also unlikely that any source populations exist in adjacent or nearby parcels.

## Special-Status Animals

The historic anthropogenic disturbances in the project site and adjacent parcels (i.e., farming, disking, off-highway vehicles, etc.) have greatly altered, eliminated, or impacted the pre-settlement habitats needed to support most of the special-status animal species identified in the CNDDDB and USFWS queries (refer to Appendix D). There are no known occurrences of any special-status animal species in the project site, and none were observed during the April 2020 field survey. Nonetheless, suitable habitat for several regionally-occurring special-status species is present in the project site and those species are discussed in further detail below.

Two special-status animal species, San Joaquin kit fox (*Vulpes macrotis mutica*), and burrowing owl (*Athene cunicularia*) have a moderate potential to occur in the project site due to the presence of suitable habitat and known records in the project vicinity. However, no sign which would indicate occupation or use by these species (e.g., scat, tracks, nesting materials, prey remains, or any other sign) was identified. Several small mammal burrows, including active California ground squirrel burrows and others (likely those of California vole [*Microtus californicus*], and/or Botta’s pocket gopher [*Thomomys bottae*]), were observed within the grassland habitats in the project site. None of the small mammal burrows observed in the project site exhibited features typical of occupied kit fox or burrowing owl burrows, although there is some potential for use by these species in the future. It should also be noted that the April 2020 survey took place at a time when regional documented burrowing owl habitat was occupied by the species (eBird 2020).

The project site contains foraging habitat for certain raptors such as the Swainson’s hawk (*Buteo swainsoni*) but potential tree-nesting habitat is extremely limited on the project site (only one nonnative tree was present during the April 2020 survey). Suitable avian nesting habitat in the project site is limited to that which supports ground-nesting species such as Savannah sparrow (*Passerculus sandwichensis*) and other birds that may nest in the annual herbaceous cover.

The evaluation of special-status animal species occurrence within the project site was based on a habitat suitability analysis. It did not include exhaustive surveys to determine their presence or absence, but did include direct observation of on-site and off-site conditions and a review of the available recorded occurrence data from the area to conclude whether or not a particular species could be expected to occur. Based on this analysis, it is unlikely that the remaining special-status wildlife species listed in Appendix D occur within the project site. Significant adverse impacts to special-status wildlife species are not anticipated with the implementation of the recommended impact avoidance, minimization, and mitigation measures described in further detail below.

### Critical Habitat

The project site is not located within or adjacent to designated or proposed critical habitat for any species.

### Jurisdictional Aquatic Resources

With the exception of an open segment of Peoples Ditch (an irrigation canal excavated in the late 1800's), the project site is strictly upland in nature with well-drained soils.

The Peoples Ditch is an artificially-constructed and maintained irrigation canal (owned and operated by the Peoples Ditch Company) that conveys diverted water to farmland south of the project site. Within the Hanford region, Peoples Ditch has open trapezoidal sections as well as portions that run underground through culverts of various sizes and lengths. At the project site, the Peoples Ditch is an open trapezoidal channel measuring approximately 32 feet in width from the top-of-bank to top-of-bank and approximately 10 feet deep. Most of the canal was dry during the April 2020 site survey, indicating an ephemeral flow regime at this location. The active channel width (e.g., area typically subject to seasonal flows) was measured in two locations (one near the culvert outfall at the southern terminus of Campus Drive/railroad alignment, and one near the southern culvert inlet that goes under State Route 198); the active channel width measures approximately 12 feet wide. The canal appears to be regularly maintained for vegetation control and irrigation water conveyance.

Three plants typically associated with wetlands were observed in the canal: seep monkeyflower (*Mimulus guttatus*), western marsh cudweed (*Gnaphalium palustre*), and common knotweed (*Persicaria lapathifolia*). Additionally, Sierran tree frog (*Pseudacris sierra*) were heard calling and California toad (*Anaxyrus boreas halophilus*) tadpoles were observed within the canal. Litter and signs of other human disturbance were also present within the canal.

Due to the presence of a bed and bank and presence of water-dependent plants and wildlife, the Peoples Ditch may fall within the jurisdiction of CDFW under Section 1602 of the California Fish and Game Code and the Regional Water Quality Control Board (RWQCB) under the California Water Code. However, the Peoples Ditch does not appear to have a downstream nexus with any jurisdictional water of the United States based on analysis of aerial imagery and topographic maps, and pursuant to the *Navigable Waters Protection Rule* (EPA and DOA 2020), effective June 22, 2020, the Peoples Ditch does not meet the definition of a jurisdictional water of the United States subject to regulation under Section 404 of the federal Clean Water Act. Furthermore, the Peoples Ditch does not meet the wetland criteria outlined in the *State Wetland Definition and Procedures for*

*Discharges of Dredged or Fill Material to Waters of the State* (SWRCB 2019), which excludes agricultural ditches with ephemeral flow that are not a relocated water of the state or excavated in a water of the state. Nevertheless, prior to any project project-related impacts to Peoples Ditch, it is recommended to consult with the United States Army Corps of Engineers (USACE), CDFW, and RWQCB to verify the feature's jurisdictional status, and obtain applicable permit(s) and/or authorization(s), if any.

### Wildlife Movement and Habitat Connectivity

The project site is isolated from natural areas and is surrounded by existing developments and highways. Therefore, it is unlikely that the site serves as an important corridor for animals moving locally, regionally, or in broader migrations. Migratory bird species may utilize the project site for foraging; however, the usage is likely transient and limited to species that forage over open grassland areas. The project site does not possess any characteristics that would indicate a locally significant stopover point for migratory species including raptors or waterfowl.

No known wildlife movement corridors occur within the project site or in the immediate vicinity.

### Regional Habitat Conservation Plans and Local Policies

The City of Hanford and Kings County currently do not have a regional Natural Community Conservation Plan or Habitat Conservation Plan. The 2035 General Plan for the City of Hanford outlines local relevant policies related to biological resources. Below is the list of applicable policies:

- 5.5.1 Natural Habitat: Goal 04: Protection of natural habitat and other biological resources.
  - *Policy 031 Provision of Open Space Areas*: Preserve and enhance open space area.
  - *Policy 032 Wetland and Riparian Corridor*: Where appropriate and feasible, establish permanent mechanisms to protect wetlands and riparian corridors.
  - *Policy 033 Vernal Pools*: Identify and protect vernal pools that be located in Planning Area.
  - *Policy 035 Impacts from Development*: Ensure that potential impacts to biological resources and sensitive habitat are carefully evaluated when considering development projects.
  - *Policy 037 Mature Trees*: Promote the preservation of existing mature trees and encourage the planting of appropriate shade trees in new developments.
  - *Policy 038 Native Tree Species and Drought Tolerant Vegetation*: Encourage the planting of native tree species and drought-tolerant vegetation.
- 5.5.2 Wildlife and Sensitive Species
  - *Policy 039 Endangered Wildlife and Habitat*: Establish programs in connection with environmental review processes to protect endangered wildlife and their habitats.
  - *Policy 040 Sensitive Wildlife*: Work with state, federal, and local agencies on the preservation of sensitive wildlife species in the City.



## IMPACT FINDINGS AND RECOMMENDED MITIGATION MEASURES

The following impact assessment and recommended mitigation measures are intended to support the CEQA review process. The project, as proposed by the applicant, coupled with LSA's survey results and review of biological literature, provided the basis for this analysis. The impact discussion below addresses the range of impacts that could result from the proposed project, as well as recommended mitigation measures that would avoid, reduce, or compensate for such impacts.

### SPECIAL-STATUS NATURAL COMMUNITIES

The project site does not contain any special-status natural communities and such habitats would not be impacted by the proposed project.

### SPECIAL-STATUS SPECIES

No special-status plant species are expected to occur within the project site or to be adversely affected by the proposed project.

While no special-status animal species (or signs of such species) were observed on site during the April 2020 survey, several small mammal burrows were observed within the project site that are considered suitable habitat for burrowing owl, a California Species of Special Concern, and/or San Joaquin kit fox, a federally listed as endangered and state-listed as threatened species. None of the small mammal burrows observed in the project site exhibited features typical of occupied kit fox or burrowing owl burrows at the time of the survey, although there is some potential for use by these species in the future. Potentially significant direct and indirect impacts, including mortality, harassment, or other forms of incidental take, could occur if construction-related ground disturbance occurs in or around an occupied den or burrow.

No other special-status species were determined to have a moderate or high probability of occurrence on the project site (refer to Appendix D). The removal of the disturbed annual grassland habitat documented on the project site is not anticipated to substantially impact the population sizes of any special-status animal species given the context and setting of the project site and additional habitats for such species in the project vicinity.

While suitable habitat for shrub and tree nesting birds is very limited on the project site (only one tree occurs within the site boundaries), the project site does contain suitable nesting habitat for a variety of ground-nesting birds and for other birds that could nest in the annual herbaceous vegetation. Nesting birds are protected under the California Fish and Game Code. Construction activities that occur during the nesting bird season (typically February 15 through September 15) have potential to result in the direct or indirect take of nesting birds.

If unmitigated or avoided, these potential direct and indirect impacts on special-status wildlife species and nesting birds could be considered potentially significant. However, implementation of Mitigation Measures BIO-1 through BIO-4, as summarized below, would effectively mitigate any impacts on special-status wildlife species to less-than-significant levels.

**Mitigation Measure BIO-1: Conduct Preconstruction Clearance Surveys for San Joaquin Kit Fox and Burrowing Owl.** A preconstruction clearance survey is required for San Joaquin kit fox and burrowing owl no more than 30 calendar days prior to initiation of project activities. All survey results must be delivered to the USFWS, the CDFW, and the City of Hanford. If the survey results find an active burrow of one or both of these species on the project site, the applicant must coordinate with the applicable resource agencies (CDFW for burrowing owl, CDFW and USFWS for kit fox) to obtain applicable agency approval(s)/permit(s) prior to any ground disturbance activities on the site.

Specific avoidance, den excavation, passive relocation, and compensatory mitigation activities shall be performed as required by the applicable agency. Appropriate provisions of the *CDFW Staff Report on Burrowing Owl Mitigation* (CDFG 2012) and *USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (USFWS 2011) shall be adhered to.

**Mitigation Measure BIO-2. Worker Environmental Awareness Training.** Prior to initial groundbreaking, Worker Environmental Awareness Training shall be conducted by a qualified biologist to educate all construction personnel on the relevant federal, state, and local laws related to potentially occurring special-status species at the site. The tailgate session shall include training on identification of species that may be found on the project site, the status of those species, and any legal protection afforded to those species. Personnel will be advised to report any special-status species encountered promptly. A fact sheet conveying this information will be prepared for display or for distribution to anyone who may enter the project site.

**Mitigation Measure BIO-3. Construction Site Housekeeping and Operational Requirements.** Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities shall be minimized by adhering to the following *USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (USFWS 2011):

- A. To minimize temporary disturbances, all project-related vehicle traffic shall be restricted to established roads, construction areas, and other designated areas. These areas shall also be included in preconstruction surveys and, to the extent possible, shall be established in locations disturbed by previous activities to prevent further impacts.
- B. Project-related vehicles shall observe a daytime speed limit of 20-mph throughout the site in all project sites, except on county roads

and state and federal highways; this is particularly important at night when kit foxes are most active. Night-time construction shall be minimized to the extent possible. However if it does occur, then the speed limit shall be reduced to 10-mph. Off-road traffic outside of designated project sites shall be prohibited.

- C. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2-feet deep shall be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the USFWS and the CDFW shall be contacted.
- D. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until the USFWS and CDFW have been consulted. If necessary, and under the direct supervision of a qualified biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped. In the case of trapped animals, escape ramps or structures shall be installed immediately to allow the animal(s) to escape, or the USFWS and CDFW should be contacted for further guidance.
- E. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from a construction or project site.
- F. Pets, such as dogs or cats, shall not be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.
- G. Use of rodenticides and herbicides in project sites shall be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. If rodent control must be

conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

**Mitigation Measure BIO-4: Nesting Bird Surveys and Avoidance.** If vegetation removal, construction, or grading activities are planned to occur within the active nesting bird season (February 15 through September 15), a qualified biologist shall conduct a preconstruction nesting bird survey no more than 5 days prior to the start of such activities. The nesting bird survey shall include the project site and areas immediately adjacent to the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust, etc. For any active nest(s) identified, the qualified biologist shall establish an appropriate buffer zone around the active nest(s). The appropriate buffer shall be determined by the qualified biologist based on species, location, and the nature of the proposed activities. Project activities shall be avoided within the buffer zone until the nest is deemed no longer active by the qualified biologist.

## CRITICAL HABITAT

The project would not result in any impacts to critical habitat, and no additional mitigation is required.

## JURISDICTIONAL AQUATIC RESOURCES

The project proposes to convert an open trapezoidal segment of Peoples Ditch (an excavated irrigation canal) to a 66-inch-diameter below-ground pipe culvert which would terminate approximately 20 feet short of the existing pipe culvert that runs under State Route 198. Approximately 0.50 acre of the irrigation canal would be undergrounded as part of the project.

As previously discussed, Peoples Ditch does not meet the definition of a jurisdictional water of the United States pursuant to the *Navigable Waters Protection Rule* (EPA and DOA 2020), effective June 22, 2020. Furthermore, Peoples Ditch does not meet the wetland criteria outlined in the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (SWRCB 2019), which excludes agricultural ditches with ephemeral flow that are not a relocated water of the state or excavated in a water of the state. Nevertheless, Peoples Ditch may fall within the jurisdiction of CDFW under Section 1602 of the California Fish and Game Code and the RWQCB under the California Water Code (e.g., the Porter-Cologne Water Quality Control Act). Furthermore, given the recent substantial changes in operable definitions that have occurred and may continue to occur, and considering the regulatory revisions and potential court actions, it is not possible to definitively predict the regulations that will be in place at the time of a particular jurisdictional determination or permit action by the USACE. Under currently effective Clean Water Act regulations and guidance, the USACE reserves the right to regulate certain resources on a case-by-case basis. Therefore, Regulatory Compliance Measure BIO-1 is recommended.

**Regulatory Compliance Measure BIO-1:**

**Agency Coordination for Peoples Ditch.** Prior to any modifications to Peoples Ditch, it is recommended to consult with the USACE, CDFW, and RWQCB to verify the feature's jurisdictional status and obtain applicable permit(s) and/or authorization(s). A notification of streambed alteration should be submitted to the California Department of Fish and Wildlife in accordance with Section 1602 of the California Fish and Game Code. Unless categorically excluded under effective definitions or existing documentation confirms that no permit is needed, the Central Valley RWQCB and Sacramento District of the USACE should be consulted regarding potential permitting needs under the California Water Code and federal Clean Water Act, respectively, associated with the proposed Peoples Ditch modifications.

Implementing applicable permit measures would prevent or compensate for impacts on jurisdictional aquatic resources. Considering the status of Peoples Ditch as a constructed and maintained irrigation canal and the lack of natural drainages, riparian areas, and wetlands on the project site, the project would not result in a substantial adverse effect on state or federally protected wetlands through direct removal, filling, hydrological interruption, or by other means. The impact is considered less than significant.

## **WILDLIFE MOVEMENT AND HABITAT CONNECTIVITY**

The wildlife species that occur in the project vicinity are adapted to the urban-wildland interface, and the project would not introduce new affects to the area. The noise, vibration, light, dust, or human disturbance within construction areas would only temporarily deter wildlife from using areas in the immediate vicinity of construction activities. These indirect effects could temporarily alter migration behaviors, territories, or foraging habitats in select areas. However, because these are temporary effects, it is likely that wildlife already living and moving in close proximity to urban development would alter their normal functions for the duration of the project construction and then re-establish these functions once all temporary construction effects have been removed. The proposed project would not place any permanent barriers within any known wildlife movement corridors or interfere with habitat connectivity. The impact is considered less than significant, and no additional mitigation is required.

## **REGIONAL HABITAT CONSERVATION PLANS AND LOCAL POLICIES**

- 5.5.1 Natural Habitat: Goal 04: Protection of natural habitat and other biological resources.
  - o *Policy 031 Provision of Open Space Areas:* Preserve and enhance open space area.



Consistency Analysis: The project site is located within the Highway Commercial land use designation and is isolated from open space areas; therefore the project is considered consistent with this policy.

- o *Policy 032 Wetland and Riparian Corridor:* Where appropriate and feasible, establish permanent mechanisms to protect wetlands and riparian corridors.

Consistency Analysis: The project is not located within wetlands or riparian corridors; therefore the project is considered consistent with this policy.

- o *Policy 033 Vernal Pools:* Identify and protect vernal pools that be located in Planning Area.

Consistency Analysis: Vernal pools are not located within the project site; therefore the project is considered consistent with this policy.

- o *Policy 035 Impacts from Development:* Ensure that potential impacts to biological resources and sensitive habitat are carefully evaluated when considering development projects.

Consistency Analysis: No sensitive or special-status natural communities occur on the project site. An appropriately-timed field survey and biological resources assessment were conducted on the project site to determine the likelihood and suitability of sensitive habitat and species; the project is not likely to result in significant impacts on sensitive resources with the implementation of recommended measures. Therefore, the project is considered consistent with this policy.

- o *Policy 037 Mature Trees:* Promote the preservation of existing mature trees and encourage the planting of appropriate shade trees in new developments.

Consistency Analysis: The development plan includes the removal of one nonnative tree. The project will include the planting of trees as part of the landscaping plan, resulting in an overall increase in shade trees within the project area. Therefore, the project is considered consistent with this policy.

- o *Policy 038 Native Tree Species and Drought Tolerant Vegetation:* Encourage the planting of native tree species and drought-tolerant vegetation.

Consistency Analysis: The landscaping plan will be provided in accordance with Section 17.52 Landscape Standards of the Hanford Municipal Code; all species of trees shall be selected from a list approved by the City's Parks Division. Therefore, the project is considered consistent with this policy.

- 5.5.2 Wildlife and Sensitive Species

- o *Policy 039 Endangered Wildlife and Habitat:* Establish programs in connection with environmental review processes to protect endangered wildlife and their habitats.

Consistency Analysis: An appropriately-timed field survey and literature reviews were conducted for the project in support of the CEQA review process. Based on the analysis and with implementation of the recommended mitigation measures contained herein, it is unlikely that any endangered species would be adversely affected by the project. Therefore, the project is considered consistent with this policy.

- o *Policy 040 Sensitive Wildlife:* Work with state, federal, and local agencies on the preservation of sensitive wildlife species in the City.

Consistency Analysis: Implementation of recommended Mitigation Measures BIO-1 through BIO-4, as described above, would ensure consistency with applicable resource agency policies with regard to sensitive wildlife species determined to have potential of occurring on the project site. Therefore, the project is considered consistent with this policy.

With implementation of the recommended mitigation measures listed above, the proposed project would not conflict with any regional habitat conservation plan or local policies related to the protection and conservation of biological resources.

## CONCLUSION

Based on field observations coupled with the habitat suitability analysis conducted for this assessment, the proposed project has low-to-moderate potential to impact several regionally-occurring special-status wildlife species, but is not anticipated to impact any special-status plant species, natural communities, or other habitats of concern. The implementation of the recommended mitigation measures detailed herein would ensure consistency with local policies related to biological resources, and would reduce any potentially significant impacts on special-status wildlife species to a less than significant level.

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## APPENDIX A

### FIGURES



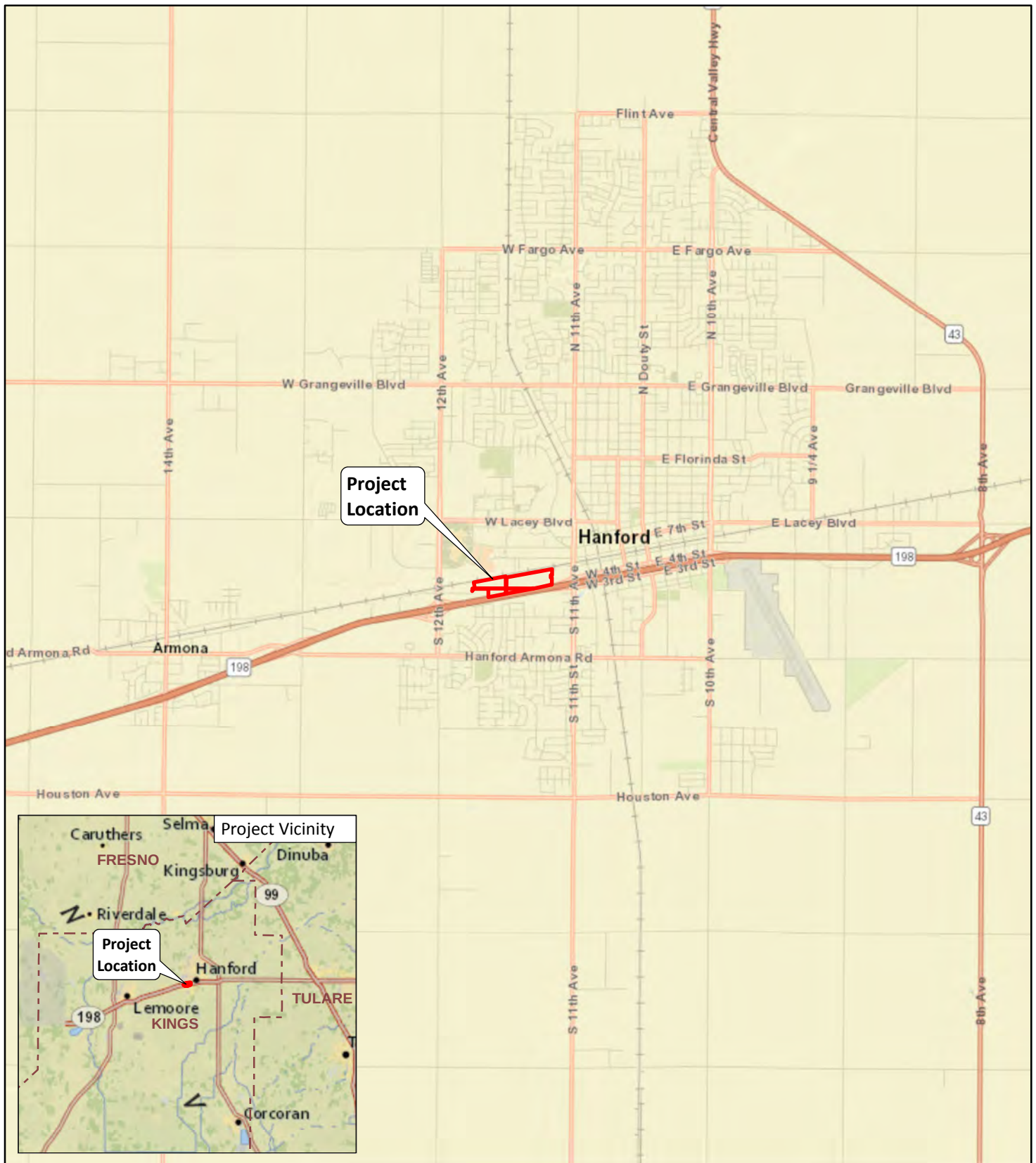
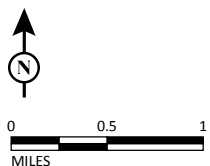


FIGURE 1

LSA

LEGEND

Project Site



SOURCE: Esri World Street Map (2020); National Geographic (2020).

I:\EPI2001\GIS\Maps\Figure 1\_Regional Location.mxd (4/13/2020)

*Hanford Place Project*  
*Hanford, Kings County, California*  
 Regional Location





FIGURE 2

LSA

LEGEND

Project Site



0 250 500  
FEET

SOURCE: Google Aerial Imagery (2020).

\\PTR11\images\EPI2001\GIS\Maps\Figure 2\_Project Location\_rev1.mxd (5/11/2020)

*Hanford Place Project*  
*Hanford, Kings County, California*  
**Project Location**





FIGURE 3

LSA



SOURCE: LANGDON WILSON INTERNATIONAL, 2020.

FRE10\P:\EPI2001 Hanford Place\PRODUCTS\Figure\_3.ai (4/22/2020)

Hanford Place Project  
Hanford, Kings County, California  
Site Plan





LSA

#### LEGEND

  Project Site

#### Vegetation and Land Use Type

Developed

Barren/Disturbed

Peoples Ditch- Irrigation Canal

Wild Oats and Annual Brome Grassland



0 250 500  
FEET

SOURCE: Google Aerial Imagery (2020).

\\PTR11\images\EPI2001\GIS\Maps\Figure 4\_Vegetation Map\_rev1.mxd (6/10/2021)

FIGURE 4

*Hanford Place Project*  
*Hanford, Kings County, California*  
**Vegetation Map**





FIGURE 5

LSA



0 250 500  
FEET

LEGEND

Project Site

Soil Type

149-Nord complex, 0 to 2 percent slopes MLRA 17

167- Urban land

SOURCE: Google Aerial Imagery (2020).

\\PTR11\images\EPI2001\GIS\Maps\Figure 5\_Soils Map.mxd (4/30/2020)

*Hanford Place Project*  
*Hanford, Kings County, California*  
**Soils Map**



## APPENDIX B

### PLANT SPECIES OBSERVED

The table below contains a list of plant species identified on the project site by LSA Biologist Kelly McDonald on April 27, 2020.

### Plant Species Observed

| EUDICOTS                         |                            |
|----------------------------------|----------------------------|
| <b>Amaranthaceae</b>             | <b>Amaranth family</b>     |
| * <i>Amaranthus albus</i>        | pigweed amaranth           |
| <b>Asteraceae</b>                | <b>Sunflower Family</b>    |
| * <i>Erigeron bonariensis</i>    | flax-leaved horseweed      |
| <i>Erigeron canadensis</i>       | Canadian horseweed         |
| <i>Gnaphalium palustre</i>       | Western marsh cudweed      |
| <i>Helianthus annuus</i>         | common sunflower           |
| * <i>Lactuca serriola</i>        | prickly lettuce            |
| <i>Matricaria discoidea</i>      | pineapple weed             |
| * <i>Silybum marianum</i>        | milk thistle               |
| * <i>Soncus asper</i>            | spiny sow-thistle          |
| <b>Boraginaceae</b>              | <b>Borage family</b>       |
| <i>Amsinckia menziesii</i>       | common fiddleneck          |
| <b>Brassicaceae</b>              | <b>Mustard Family</b>      |
| * <i>Capsella bursa-pastoris</i> | Shepherd's purse           |
| * <i>Hirschfeldia incana</i>     | shortpod mustard           |
| * <i>Lepidium didymum</i>        | lesser swine cress         |
| * <i>Raphanus raphanistrum</i>   | wild radish                |
| * <i>Sisymbrium altissimum</i>   | tumble mustard             |
| * <i>Sisymbrium irio</i>         | London rocket              |
| <b>Chenopodiaceae</b>            | <b>Goosefoot Family</b>    |
| * <i>Salsola tragus</i>          | Russian thistle            |
| <b>Geraniaceae</b>               | <b>Geranium Family</b>     |
| * <i>Erodium malacoides</i>      | Mediterranean storks' bill |
| <b>Fabaceae</b>                  | <b>Legume Family</b>       |
| * <i>Melilotus albus</i>         | whitesweet clover          |
| * <i>Melilotus indicus</i>       | yellow sweetclover         |
| <i>Trifolium willdenovii</i>     | Tomcat clover              |
| <b>Malvaceae</b>                 | <b>Mallow Family</b>       |
| * <i>Malva parviflora</i>        | cheeseweed mallow          |
| <b>Polygonaceae</b>              | <b>Buckwheat Family</b>    |
| <i>Persicaria lapathifolia</i>   | common knotweed            |
| * <i>Rumex crispus</i>           | curly dock                 |
| <b>Phrymaceae</b>                | <b>Lopseed Family</b>      |
| <i>Erythranthe guttata</i>       | common monkeyflower        |
| <b>Solanacea</b>                 | <b>Nightshade Family</b>   |

### Plant Species Observed

|                                              |                      |
|----------------------------------------------|----------------------|
| * <i>Solanum elaeagnifolium</i>              | white-horse nettle   |
| <b>Simaroubaceae</b>                         | <b>Quassi Family</b> |
| * <i>Ailanthus altissima</i>                 | tree of heaven       |
| <b>MONOCOTS</b>                              |                      |
| <b>Poaceae</b>                               | <b>Grass Family</b>  |
| * <i>Avena barbata</i>                       | wild oat             |
| * <i>Bromus diandrus</i>                     | ripgut grass         |
| * <i>Bromus madritensis ssp. rubens</i>      | red brome            |
| * <i>Bromus madritensis ssp. madritensis</i> | foxtail chess        |
| * <i>Bromus tectorum</i>                     | cheat grass          |
| * <i>Hordeum murinum</i>                     | foxtail barley       |
| * <i>Polypogon monspeliensis</i>             | rabbitsfoot grass    |
| * <i>Sorghum halepense</i>                   | Johnsongrass         |

\* = nonnative species

## APPENDIX C

### REPRESENTATIVE SITE PHOTOS



Site overview showing disturbed areas and wild oats and annual brome grassland vegetation. Photo taken facing east from the central portion of the project site, east of Peoples Ditch. April 27, 2020.



The southwest portion of the project site supports wild oats and annual brome grassland vegetation. Photo taken facing west near Highway 198, near the southwestern corner of the project site. April 27, 2020.





View of Peoples Ditch and barren areas, facing northwest. A single tree (*Ailanthus altissima*; nonnative species) is present on the project site. April 27, 2020.



View of Peoples Ditch and barren areas, facing west. April 27, 2020.



View of Peoples Ditch, facing south near the Campus Drive culvert outfall. April 27, 2020.



View of existing Peoples Ditch culvert inlet that goes underneath Highway 198, facing south. Visible signs of debris and human disturbance were observed within the canal. April 27, 2020.



Site overview showing disturbed/barren areas, debris, and wild oats and annual brome grassland vegetation. Photo taken facing east from the northeastern corner of the project site. April 27, 2020.



Site overview showing disturbance from off-highway vehicle use, foot paths, and wild oats and annual brome grassland vegetation. Photo taken facing east near the northern portion of the project site. April 27, 2020.

**LSA**

APPENDIX B  
(Sheet 3 of 4)

*Hanford Place Project*

Site Photographs





One of several burrows located in the barren areas surrounding Peoples Ditch. No burrowing owl or kit fox sign was detected at any of the observed burrows. April 27, 2020.



View of the northeastern portion of the project site showing the worn foot path and wild oats and annual brome grassland vegetation, near the railroad tracks. April 27, 2020.

## APPENDIX D

### SPECIAL-STATUS SPECIES IDENTIFIED AS POTENTIALLY OCCURING IN THE PROJECT VICINITY

**Table D-1: Special-Status Plant Species Potentially Occurring in the Project Vicinity**

| Common Name          | Scientific Name                                       | Status                       | General Habitat Description                                                                                                                                                               | Flowering Period | Likelihood of Occurrence and Rationale                                                                                                                                                                                                                                                                             |
|----------------------|-------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Earliart orache      | <i>Atriplex cordulata</i><br><i>var. erecticaulis</i> | US: –<br>CA: –<br>CNPS: 1B:2 | Annual herb occurring in valley and foothill grassland between 40 and 100 m in elevation. Kings, Kern and Tulare counties.                                                                | August-September | <b>Not Expected.</b> There are no known historical records of occurrence in the project vicinity <sup>1</sup> and suitable habitat is limited in the project area; the maintained nature of the project area reduces the likelihood of occurrence.                                                                 |
| Brittlescale         | <i>Atriplex depressa</i>                              | US: –<br>CA: –<br>CNPS: 1B:2 | Annual herb occurring in chenopod scrub, meadows, seeps, valley/foothill grasslands, playas and vernal pools between 1 and 320 m elevation. Found in Central Valley counties.             | April-October    | <b>Not Expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is limited in the project area; the maintained nature of the project area reduces the likelihood of occurrence.                                                                                         |
| Lesser saltscare     | <i>Atriplex minuscula</i>                             | US: –<br>CA: –<br>CNPS: 1B:1 | Annual herb occurring in chenopod scrub, valley/foothill grassland, and playas in sandy soils between 15 and 200 m in elevation. Found in Central Valley counties.                        | May-October      | <b>Low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and suitable habitat is limited in the project area; the maintained nature of the project area reduces the likelihood of occurrence.                                                                        |
| Subtle orache        | <i>Atriplex subtilis</i>                              | US: –<br>CA: –<br>CNPS: 1B:2 | Annual herb occurring in valley and foothill grassland on alkaline soils between 40 and 100 m in elevation. Found in Central Valley counties.                                             | June-October     | <b>Low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and suitable habitat is limited in the project area; the maintained nature of the project area reduces the likelihood of occurrence.                                                                        |
| Recurved larkspur    | <i>Delphinium recurvatum</i>                          | US: –<br>CA: –<br>CNPS: 1B.2 | Perennial herb associated with chenopod scrub, cistomante woodlands, and valley/foothill grasslands on alkaline soils between 3 and 790 m in elevation. Found in Central Valley counties. | March-June       | <b>Not expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is limited in the project area; the maintained nature of the project area reduces the likelihood of occurrence. The April 2020 survey was conducted during the typical blooming period of this species. |
| Panoche pepper-grass | <i>Lepidium jaredii</i><br><i>ssp. album</i>          | US: –<br>CA: –<br>CNPS: 1B.2 | Annual herb occurring in valley and foothill grasslands on steep slopes with clay and alkaline soils between 185 and 745 m elevation. Fresno, San Benito and San Luis Obispo counties.    | February-June    | <b>Not Expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat conditions are absent in the project area.                                                                                                                                                              |



**Table D-1: Special-Status Plant Species Potentially Occurring in the Project Vicinity**

| Common Name             | Scientific Name            | Status                       | General Habitat Description                                                                                                                                                                                               | Flowering Period | Likelihood of Occurrence and Rationale                                                                                                                                                                                                           |
|-------------------------|----------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mud nama                | <i>Nama stenocarpa</i>     | US: –<br>CA: –<br>CNPS: 1B.1 | Annual/perennial herb occurring lake margins, river banks, marshes and swamps between 5 and 500 m in elevation. Found in interior southern California counties.                                                           | January-July     | <b>Not Expected.</b> There are historical records of occurrence in the project vicinity (CNDDDB 1942); however, suitable habitat is limited in the project area; the maintained nature of the project area reduces the likelihood of occurrence. |
| California alkali grass | <i>Puccinellia simplex</i> | US: –<br>CA: –<br>CNPS: 1B.2 | Annual herb occurring in chenopod scrub, vernal pools, valley/foothill grasslands, and meadows/seeps. On alkaline, vernal mesic, sinks, flats and lake margins between 2 and 930 m in elevation. Central Valley counties. | March-May        | <b>Not Expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is limited in the project area; the maintained nature of the project area reduces the likelihood of occurrence.                       |

<sup>1</sup>Project vicinity = Project area plus a 5 mile buffer

Status: Federal Endangered (FE), Federal Threatened (FT), Federal Candidate (FC), Federal Proposed (FP, FPE, FPT), Federal Delisted (FD), California Endangered (CE), California Threatened (CT), California Species of Special Concern (SSC), California Fully Protected Species (CFP), California Special Plant (CSP), California Special Animal (CSA)

California Native Plant Society Designations:

1B = Rare, threatened, or endangered in California and elsewhere

2B = Rare, threatened, or endangered in California, but not elsewhere

0.1 = seriously endangered

0.2 = fairly endangered

CA = California

CNPS = California Native Plant Society

ft = foot/feet

m = meter/meters

mi = mile/miles

US = United States

**Table D-2: Special-Status Animal Species Potentially Occurring or Known to Occur in the Project Vicinity**

| Common Name                       | Scientific Name                          | Status Listing     | Habitat and Comments                                                                                                                                                                                                          | Likelihood of Occurrence and Rationale                                                                                                                                                                                                                                                                     |
|-----------------------------------|------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>INVERTEBRATES</b>              |                                          |                    |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                            |
| Valley elderberry longhorn beetle | <i>Desmocerus californicus dimorphus</i> | US: FT<br>CA: –    | Requires elderberry trees, usually in riparian ecosystems, as host sources for breeding and forage.                                                                                                                           | <b>Not Expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is absent in the project area.                                                                                                                                                                  |
| San Joaquin tiger beetle          | <i>Cicindela tranquebarica ssp.</i>      | US: –<br>CA: –     | Known only to occur in Tulare and Kings counties.                                                                                                                                                                             | <b>Not Expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is absent in the project area.                                                                                                                                                                  |
| vernal pool fairy shrimp          | <i>Branchinecta lynchi</i>               | US: FT<br>CA: –    | Occurs only in vernal pools or vernal pool-like habitats and does not occur in riverine, marine, or other permanent bodies of water.                                                                                          | <b>Not expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is absent in the project area.                                                                                                                                                                  |
| vernal pool tadpole shrimp        | <i>Lepidurus packardii</i>               | US: FE<br>CA: –    | Occurs only in ephemeral freshwater habitats, including alkaline pools, clay flats, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands.                                                                   | <b>Not expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is absent in the project area.                                                                                                                                                                  |
| <b>AMPHIBIANS</b>                 |                                          |                    |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                            |
| California tiger salamander       | <i>Ambystoma californiense</i>           | US: FT<br>CA: CT   | Located in riparian woodlands and valley/foothills grasslands. Requires underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources for breeding.                               | <b>Not expected.</b> There are no known records of occurrence in the project vicinity and minimal suitable habitat is present.                                                                                                                                                                             |
| Western spadefoot                 | <i>Spea hammondi</i>                     | US: FCT<br>CA: SSC | Occurs primarily in grassland and other relatively open habitats. Found in elevations ranging from sea level to 4,500 ft. Requires temporary pools for breeding.                                                              | <b>Low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and minimal suitable habitat is present within the canal and the surrounding grassland. However, debris and human disturbance were observed within the canal limiting the likelihood of occurrence. |
| <b>REPTILES</b>                   |                                          |                    |                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                            |
| California glossy snake           | <i>Arizona elegans occidentalis</i>      | US:-<br>CA: SSC    | Occurs in low-elevation arid scrub, open woodland, grasslands, and chaparral slope habitats throughout the southwest and into Mexico. Dependent on diurnal lizards for major food source, small reptiles, birds, and mammals. | <b>Low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and minimal suitable habitat is present.                                                                                                                                                            |
| Blunt-nosed leopard lizard        | <i>Gambella sila</i>                     | US: FE<br>CA: CE   | Prefers sparsely vegetated arid grasslands and brush/scrub where there are abundant rodent burrows. Rare or absent in dense vegetation or tall grass.                                                                         | <b>Low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and suitable habitat is largely absent in the project area due to high, dense vegetation. Human disturbance also limits the likelihood of occurrence.                                               |

**Table D-2: Special-Status Animal Species Potentially Occurring or Known to Occur in the Project Vicinity**

| Common Name          | Scientific Name                        | Status Listing    | Habitat and Comments                                                                                                                                                                                                                         | Likelihood of Occurrence and Rationale                                                                                                                                                                                                                                                                                                                                           |
|----------------------|----------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Western pond turtle  | <i>Emys marmorata</i>                  | US: –<br>CA: SSC  | Occurs in ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Upland habitat is needed for basking and breeding.                                                               | <b>Very low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and only marginally suitable habitat is present within the canal and the surrounding grassland. However, debris and human disturbance were observed within the canal, and the ephemeral flow regime limit the likelihood of occurrence.                              |
| <b>BIRDS</b>         |                                        |                   |                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                  |
| Tricolored blackbird | <i>Agelaius tricolor</i>               | US: –<br>CA: CT   | Occurs in open country or marshes in large colonies mainly in CA Central Valley. Breeds in freshwater marshes with tall emergent vegetation, feeds on insects.                                                                               | <b>Not Expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is absent in the project area.                                                                                                                                                                                                                                        |
| Burrowing owl        | <i>Athene cunicularia</i>              | US: –<br>CA: SSC  | Burrows in open, dry, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably the California ground squirrel.                   | <b>Moderate probability of occurrence.</b> There are no known occurrences on the project site and marginally suitable habitat is present in the project area. Several small mammal burrows were unoccupied during the April 2020 survey, and no owl sign was observed. Known burrow sites in the Hanford region were occupied at the time of the April 2020 survey (eBird 2020). |
| Swainson's hawk      | <i>Buteo swainsoni</i>                 | US: –<br>CA: CT   | Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannas, and agricultural/ranch lands. Requires adjacent suitable foraging areas such as grasslands, alfalfa, or grain fields supporting rodent populations. | <b>Moderate probability of foraging; Low probability of nesting.</b> There are historical records of occurrence in the project vicinity (CNDDDB 2012, 2016) where nesting occurred. The project area does contain one tree that could provide suitable nesting habitat. The surrounding grassland could also provide suitable foraging habitat.                                  |
| Western snowy plover | <i>Charadrius alexandrinus nivosus</i> | US: FT<br>CA: SSC | Inhabits sandy beaches, salt pond levees & shores of large alkali lakes. Nests on sandy, gravelly or friable soils.                                                                                                                          | <b>Low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and suitable nesting habitat is restricted to the top of the canal. However, debris and human disturbance were observed within project area limiting the likelihood of occurrence.                                                                                        |

**Table D-2: Special-Status Animal Species Potentially Occurring or Known to Occur in the Project Vicinity**

| Common Name             | Scientific Name                          | Status Listing   | Habitat and Comments                                                                                                                                                                                             | Likelihood of Occurrence and Rationale                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Yellow-headed blackbird | <i>Xanthocephalus xanthocephalus</i>     | US: –<br>CA: SSC | Known to inhabit marshes and riparian areas in the Central Valley.                                                                                                                                               | <b>Not Expected.</b> There are no known records of occurrence in the project vicinity and suitable habitat is absent in the project area.                                                                                                                                                                                                                                                                                                                                                    |
| <b>MAMMALS</b>          |                                          |                  |                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Tipton kangaroo rat     | <i>Dipodomys nitratoides nitratoides</i> | US: FE<br>CA: CE | Inhabits open lands with sparse wood shrubs and low cover of annual grasses and forbs, alkali and saltbush scrublands.                                                                                           | <b>Low probability of occurrence.</b> There are no known records of occurrence in the project vicinity and suitable habitat is largely absent in the project area due to high, dense vegetation. Several small mammal burrows were unoccupied during the April 2020 survey, however debris and human disturbance were observed within the project area limiting the likelihood of occurrence                                                                                                 |
| Hoary bat               | <i>Lasiurus cinereus</i>                 | US: –<br>CA: CSA | Prefers open habitats or habitat mosaics with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water. | <b>Roosting Not Expected.</b> There is a historical record of occurrence in the project vicinity (CNDDDB 1991). Suitable roosting habitat is absent in the project area. Some suitable foraging habitat present in the project area.                                                                                                                                                                                                                                                         |
| San Joaquin kit fox     | <i>Vulpes macrotis mutica</i>            | US: FE<br>CA: CT | Prefers open, level areas with loose-textured soils supporting scattered, shrubby vegetation with little human disturbance. Some agricultural areas may support these foxes.                                     | <b>Moderate probability of occurrence.</b> There are historical records of occurrence in the project vicinity (CNDDDB 1975, 2000, 2006). Known to historically forage and den in the project vicinity, although there are no records in the project site and the site is isolated by existing urban development. Marginal denning habitat is present in the project site. Several small mammal burrows appeared to be unoccupied during the April 2020 survey, and no fox sign was observed. |

<sup>1</sup>Project vicinity = Project area plus a 5 mile buffer

Status: Federal Endangered (FE), Federal Threatened (FT), Federal Candidate (FC), Federal Proposed (FP, FPE, FPT), Federal Delisted (FD), California Endangered (CE), California Threatened (CT), California Species of Special Concern (SSC), California Fully Protected Species (CFP), California Special Animal (CSA)

ft = foot/feet

m = meter/meters

mi = mile/miles

US = United States

CA = California

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## APPENDIX C

# CULTURAL RESOURCE INVENTORY



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# **Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project in the City of Hanford, Kings County, California**

Diana T. Dyste, Jessica Jones, Dennis McDougall,  
Ward Stanley, and Carlos van Onna

Prepared By



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August 2020  
draft



## MANAGEMENT SUMMARY

Applied EarthWorks, Inc. (Æ), at the request of the Hanford Group and under subcontract to Epic Management Group, Inc., completed a cultural resource inventory for the Hanford Place Medical and Mixed-Use Property Project (Project) in Kings County, California. The Project proposes the construction of 15 buildings and structures that will be utilized for medical outpatient clinic services, hospitality, specialized education, retail, medical offices, skilled nursing and assisted living facilities, and multifamily housing. Project activities that could cause ground disturbance include grading; trenching for installation of water, sewer, and electrical infrastructure; construction of a roundabout; and excavation of a storm water retention basin in addition to construction of buildings, structures, and facilities.

The Project must comply with the California Environmental Quality Act (CEQA), which mandates that government agencies consider the impacts of their actions on the environment, including cultural resources. This report documents whether historical resources, as defined by the CEQA Guidelines, would be adversely impacted by the proposed Project. Æ's cultural resource inventory included a records search at the California Historical Resources Information System Southern San Joaquin Valley Information Center at California State University, Bakersfield; a review of historic maps, aerial photographs, and atlases; a search of the Native American Heritage Commission's (NAHC) Sacred Lands File; nongovernmental outreach to local Native American representatives identified by the NAHC; a buried site sensitivity assessment; and an intensive pedestrian survey of the Project area to identify cultural resources observable on the ground surface.

The Southern San Joaquin Valley Information Center records search for the Project and surrounding 0.5-mile area identified nine previous investigations intersecting the Project area and five additional studies in the surrounding 0.5-mile area. One historic-era resource was identified in the Project area (a segment of Peoples Ditch) and three historic-era resources were identified in the surrounding 0.5-mile area. A search of the NAHC Sacred Lands File did not identify sacred sites in the Project area. No responses have been received in response to Æ's outreach to six Native American representatives identified by the NAHC.

Æ archaeologists conducted an intensive pedestrian survey of the Project area to identify prehistoric and historic-era cultural resources visible at the ground surface. No prehistoric sites were identified during the pedestrian survey; however, Æ recorded one isolated historic artifact (AE-4167-ISO-01) and one historic-era deposit (AE-4167-01) observed on the ground surface in the southeastern portion of the Project area.

In addition, the buried site sensitivity assessment concluded that there is high potential for the soils in previously undisturbed portions of the Project area to contain anthropogenic paleosols that may harbor intact prehistoric cultural deposits. Portions of the Project area previously disturbed by the construction of the historic-era Peoples Ditch canal and its modern realignment, or within the historic-era plow zone (up to 24 inches below the ground surface) have a much lower sensitivity for containing paleosols with intact prehistoric deposits.

To fully comply with CEQA and determine if the Project will cause a substantial adverse change in the significant qualities of a historical resource, Æ recommends additional mapping and subsurface testing of AE-4167-01 to evaluate its eligibility for inclusion in the California Register of Historical Resources, pursuant to California Public Resources Code Section 5024.1. Æ additionally recommends focused subsurface testing in areas of the site not previously disturbed by historic-era activities to confirm the presence/absence of high-sensitivity paleosols that may include intact prehistoric cultural deposits. Completion of mapping, site testing, and soil testing will allow for an adequate assessment of whether the proposed Project may cause adverse impacts to historical resources (i.e., cultural resources eligible for listing on the California Register of Historical Resources). The methods and findings of the additional study would be presented as an addendum to this report and would include cultural resource management recommendations.

Field notes and photographs are on file at Æ's office in Fresno, California. A copy of the final version of this report and associated cultural resource records will be transmitted to the Southern San Joaquin Valley Information Center for inclusion in the California Historical Resources Information System.



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# 1 INTRODUCTION

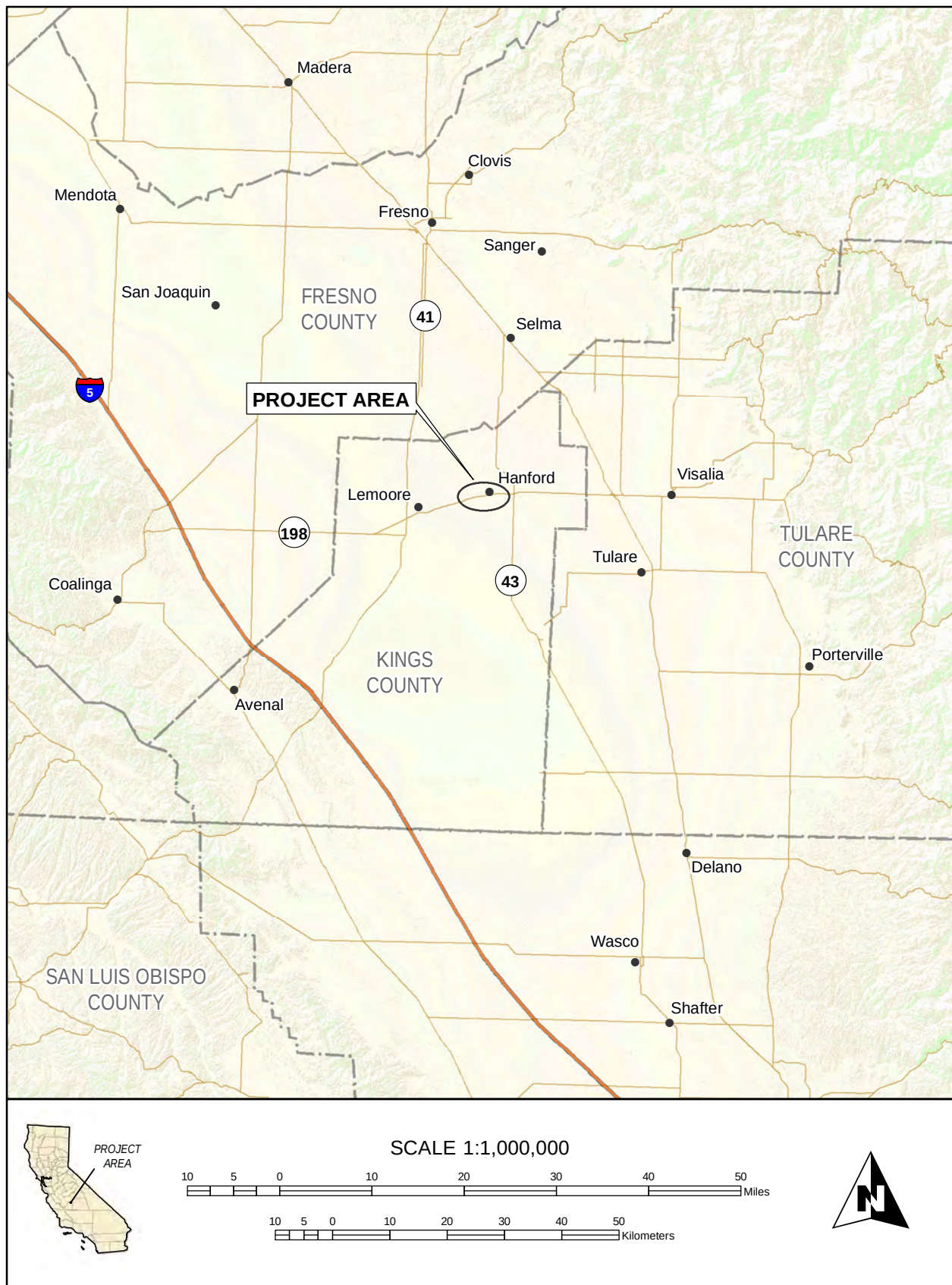
Applied EarthWorks, Inc. (Æ), under subcontract to Epic Management Group, Inc., performed a cultural resource inventory for the Hanford Place Medical and Mixed-Use Facility Project (Project) in the city of Hanford, Kings County, California (Figure 1-1). Specifically, the Project is in Section 35, Township 18 South, Range 21 East, Mount Diablo Base and Meridian (Figure 1-2). The Project includes 42.84 acres between the Burlington Northern Santa Fe Railway tracks and State Route 198 (Figure 1-3).

The Project is subject to the California Environmental Quality Act (CEQA; California Public Resources Code [PRC] Sections 21000–21189) and the CEQA Guidelines (Title 14, California Code of Regulations [CCR], Sections 15000–15387), which mandate that public agencies consider the impacts of discretionary projects on the environment, including cultural resources. If a project has the potential to cause substantial adverse change in the characteristics of an important cultural resource or “historical resource” through demolition, destruction, relocation, alteration, or other means, then the project is judged to have a significant effect on the environment (14 CCR 15064.5[b]). Sections 15064.5(a)(1–3) of the CEQA Guidelines state that a historical resource is: (1) listed or determined eligible for listing in the California Register of Historical Resources; (2) included in a local register of historical resources (pursuant to PRC Section 5020.1[k]) or identified as significant in a historical resource survey per the CRHR eligibility criteria (PRC 5024.1[c]); or (3) considered eligible by a lead agency under PRC 5020.1(j) or 5024.1. The definition subsumes a variety of resources, including prehistoric and historical archaeological sites, structures, buildings, and objects (14 CCR 15064.5[a][3] and 15064.5[c]). The City of Hanford is the lead agency for purposes of the CEQA.

## 1.1 PROJECT BACKGROUND

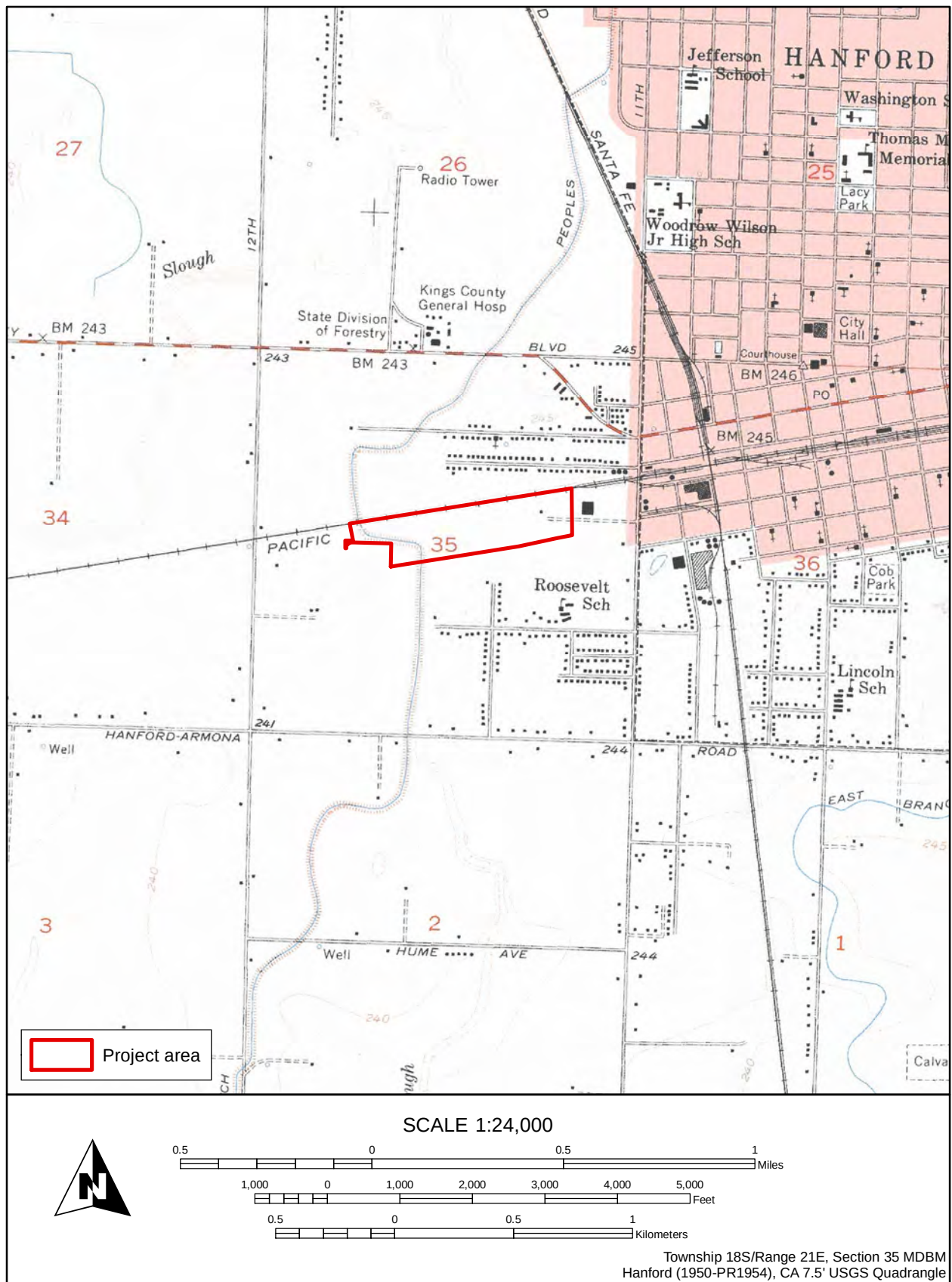
The Project proposes to construct 15 buildings, structures, and facilities that will be utilized for medical outpatient clinic services, hospitality, specialized education, retail, medical offices, skilled nursing and assisted living, and multifamily housing. Project activities with potential to cause ground disturbance would include grading; installation of water, sewer, and electrical infrastructure; construction of a roundabout; and excavation of a storm water retention basin in addition to construction of the 15 buildings and structures. The roundabout would be incorporated into the public right-of-way. Maximum depth of ground disturbance is presently undefined. Similarly, maximum height of proposed structures is not determined.

To assist the Hanford Group in fulfilling CEQA requirements for the proposed Project, Æ conducted a cultural resource inventory that included: (1) a records search at the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) to identify prior cultural resource studies and previously recorded cultural resources in the Project area and surrounding 0.5-mile area; (2) desktop archival research to better understand land use and property ownership within the Project area; (3) a search of the Native American Heritage Commission’s (NAHC) Sacred Lands File and outreach with local



**Figure 1-1 Project vicinity in Hanford, California.**





**Figure 1-2 Project location on the USGS Hanford, CA 7.5-minute quadrangle.**





**Figure 1-3 Aerial view of the Project area.**

tribal representatives; (4) a pedestrian survey of the Project area to identify potential historical resources within the Project area and preliminary recordation of identified resources on the appropriate California Department of Parks and Recreation record form(s); (5) a buried site sensitivity assessment; and (6) recommendations for further work to assess whether the proposed Project would cause adverse impacts to historical resources—i.e., cultural resources eligible for listing on the California Register.

## **1.2 PROFESSIONAL QUALIFICATIONS**

Æ Senior Archaeologist Diana T. Dyste (M.A.), a Registered Professional Archaeologist (RPA 39362477), served as project manager and co-author of this report, providing quality oversight and technical guidance. Æ Senior Architectural Historian Carlos van Onna (M.A.) conducted site-specific archival research and prepared the historic context for the Peoples Ditch (P-16-000246/CA-KIN-97H). Æ Senior Archaeologist Dennis McDougall assisted van Onna with research. Æ Staff Archaeologist Ward Stanley completed the archaeological pedestrian survey and, along with Staff Archaeologist Jessica Jones, contributed to the technical report. Staff Archaeologist/GIS Technician Flavio Silva (Ph.D.) prepared maps, report graphics, and compiled the GIS data. Résumés for key personnel are provided in Appendix A.

## **1.3 REPORT ORGANIZATION**

This technical report was prepared according to California Office of Historic Preservation (1990) standards outlined in *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* and thus fulfills the requirements for the CEQA.

Following this introduction, Chapter 2 describes the natural environment, prehistoric setting, ethnography of the region, and historic setting encompassing the Project area. Chapter 3 discusses the methods used during archival research, buried site sensitivity assessment, and archaeological and built environment surveys. Research findings and results of the survey and buried site assessment are provided in Chapter 4. A summary of findings and cultural resource management recommendations are included in Chapter 5. References cited are provided in Chapter 6, followed by Appendices A–D.



## 2 PROJECT SETTING

### 2.1 NATURAL SETTING

The Project is in the San Joaquin Valley, the southern half of an elongated trough called the Great Valley. The Great Valley is a 50-mile-wide lowland that extends approximately 500 miles south from the Cascade Range to the Tehachapi Mountains (Norris and Webb 1990:412). Between the Mesozoic and Cenozoic eras, the Great Valley served as a shallow marine embayment containing numerous lakes, primarily within the San Joaquin Valley (Norris and Webb 1990:412). Waters began to diminish around 10 million years ago during the late Pliocene and eventually were cut off from the ocean altogether by the formation of the Coast Ranges, leaving tributaries and small lakes that survived until the historic era (Hill 1984:28; Norris and Webb 1990:380).

Much of the Great Valley rests upon thick strata of alluvial sediments washed down from the Sierra Nevada and Coast Ranges during the Quaternary (Norris and Webb 1990). It is this same soil that today makes the valley a fertile agricultural region. Below these levels are layers from the Pliocene and older epochs, which consist of both marine (shale, sandstone) and nonmarine (basalt, andesite) materials. Primary soils have been developed by weathering, seasonal erosion, and mass flood events that cause downward movement of granitic parent material. Secondary soils are formed by a combination of eolian and alluvial forces that have transported granitic and assorted metamorphic and metavolcanic materials along mountain streams (Weir 1956). Quaternary and recent alluvium covers most of the valley basin (Meyer et al. 2010).

The Project area is in the Tulare Lake Basin hydrologic unit, which includes a portion of one of the San Joaquin Valley's dominant hydrologic features, the Kings River. Several smaller order creeks and streams flow north into the Kings River toward Hanford, while the westward-flowing Tule River is south of Hanford. Intermittent creeks feed the Kings River, which can remain dry for long periods of the year. However, before historic drainage projects and modern reclamation, seasonal flooding from the Kings River produced extensive wetlands in the valley. Lakes, marshes, and sloughs once covered more than 3,000 square miles in the San Joaquin Valley (Moratto 1984:168). The largest of these was ancient Tulare Lake. The lake existed approximately 25 miles southwest of the Project area and spanned as much as 30 miles from shore to shore (Preston 1981). As more water was historically diverted from major streams for agricultural purposes, the shores of the lake progressively retreated. By the early twentieth century, Tulare Lake had all but disappeared except in unusually wet years when high levels of runoff are released.

The abundance of water near and within the Project area provided a rich habitat for plants and animals in prehistory and through the historic era. Common native plants would have included white and live oaks (*Quercus* spp.) as well as walnut (*Juglans* sp.), cottonwood (*Populus fremontii*), willow (*Salix* sp.), and tule (*Schoenoplectus* sp.), and possibly hardstem bulrush (*Scirpus acutus*) and cattail (*Typha* sp.). Various grasses, forbs, and sedges would have flourished in the area. A variety of animals lived in and around the Project area prior to the modern era, including mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), tule

elk (*Cervus* sp.), pronghorn (*Antilocapra americana*), grizzly bears (*Ursus arctos californicus*) and black bears (*U. americanus*) (Preston 1981:245–247). These resources provided humans with a diverse range of medicinal, dietary, and other resources used for tool production and other subsistence purposes during prehistory and the historic era.

## **2.2 CULTURAL SETTING**

### **2.2.1 Prehistory**

The San Joaquin Valley prehistoric record is among the least understood of all regions in California. Reconstruction of past cultural patterns has been stymied by two key factors: geomorphology and human activity (Dillon 2002; Siefkin 1999). The valley floor that encompasses the Project area has been inundated with thick alluvial deposits resulting from granitic and sedimentary outflow from the Kings River, particularly during mass flood events. This pattern has continued for millennia and has resulted in the burial of early- to mid-Holocene archaeological sites, estimated to be buried at depths of up to 10 meters along the lower stretches of the San Joaquin Valley drainage systems (Meyer et al. 2010; Onken 2020). Thus, compared to other regions in the state, there is a paucity of research and a related lack of data from which to build a complete understanding of past human behavior specific to the valley.

Nevertheless, available data for sites in valley lacustrine environs help identify key cultural changes within the Project area and surrounding environs. The summary of cultural traits presented below is based on a review of San Joaquin Valley lacustrine, riverine, and valley floor site data discussed in Rosenthal et al. (2007). Cultural periods and accompanying dates (given as calibrated calendar years [cal B.C. or A.D.]) are based on Rosenthal et al. (2007:150–159), Moratto (1984:333), McGuire and Garfinkel (1980:49–53), and Bennyhoff and Fredrickson’s chronologies (Fredrickson 1973, 1974).

Archaeological investigations in the Tulare Lake and Buena Vista Lake localities suggest that people occupied the San Joaquin Valley as early as 11,000–12,000 years ago (Fredrickson and Grossman 1977; Riddell and Olsen 1969). Because there has been very little systematic and thorough archaeological excavation in the immediate vicinity of the Project area, it is unclear whether the cultural phases identified in the adjacent foothills or southern valley extend to this area. Although some limited data suggest that phases developed for Yosemite National Park and Buchanan Reservoir for the most recent period of prehistory can be extended to sites in the San Joaquin Valley (Baloian et al. 2006), there is no evidence that this holds true for earlier phases.

The Paleo-Indian Period (11,500–8550 cal B.C.) is represented by ephemeral lacustrine sites dominated by atlatl dart and spear projectile points. The earliest evidence of distinct valley cultural patterns appears during the Lower Archaic Period (8550–5550 cal B.C.) when crescents and stemmed projectile points are first used and evidence appears of dietary use of freshwater fish, waterfowl, mussels, deer, and pronghorn. The Middle Archaic (5550–550 cal B.C.) includes a time, estimated between 5950–3150 cal B.C., when semipermanent villages first appear along riverbanks in tandem with larger, more established lacustrine villages. Stone tools were used in abundance, meanwhile ground stone tool kits emerged along with long-distance trade and exchange networks focused on obsidian, shell beads, and ornaments.



New cultural patterns emerged during the Upper Archaic Period (550 cal B.C. to cal A.D. 1100), especially between 3150–1350 cal B.C. when a distinct shift in burial practices occurred and geographic differences in site and artifact types appeared. The time between 1350–650 cal B.C. is marked by the sudden presence of mound sites in the valley. Widespread proliferation of specialized technology is evident, including new types of bone tools, projectile points, and ceremonial objects such as wands and blades. Paleoethnobotanical studies also suggest the use of labor-intensive and seasonally abundant resources, including acorns, pine nuts, salmon, and shellfish. Similarly, the Emergent Period, extending from cal A.D. 1000 to the historic era, is marked by continued variation in settlement and burial patterns across the valley, coupled with the disappearance of atlatl and dart tool kits that are replaced with bow-and-arrow technology (i.e., small corner-notched and Desert series projectile points) at about cal A.D. 1000. Fishing tool kits expanded to include more efficient harpoons, bone fishhooks, and gorge hooks. In the Tulare basin, pottery obtained via trade appears as well as baked clay balls used for cooking and making carved clay effigies.

### **2.2.2 Ethnohistory**

The Project area is in the Southern Valley Yokuts ethnographic territory. The Yokuts are one of eight subgroups of the Penutian linguistic phylum that is present across the western coast and inland regions of North America from Canada to Mexico (Golla 2011:128). The Yokuts had many language subgroups and spoke a variety of mutually intelligible dialects across the San Joaquin Valley and Sierra Nevada (Golla 2011). The Southern Valley Yokuts populated the shores of Tulare, Buena Vista, and Kern lakes, their connecting sloughs, and the lower portions of the Kings, Kaweah, Tule, and Kern rivers (Latta 1999; Silverstein 1978).

The Tachi Yokut, who were the northernmost of the Tulare Lake tribes, occupied a large area of the Central Valley, extending from the western shores of Tulare Lake northward to the Fresno Slough and westward to the Coast Ranges (Kroeber 1976:484). A major ethnohistoric Tachi Yokut village *Wiu* (also *Waiu*, or Mussel Slough) was just south of Lemoore. *Wiu* is at the present location of the Santa Rosa Rancheria Tachi Yokut reservation, approximately 9 miles southwest of the Project area (Kroeber 1976:484).

During the historic era, the general vicinity of Hanford was a seasonal plant, seed, and nut collection area for local tribes. The Tachi Yokut relied on the plentiful supply of lacustrine and riverine resources, including lake trout, chubs, perch, and suckers as well as turtles and freshwater shellfish. Wild seeds and acorns were harvested in the early summer and fall, respectively, and stored for use throughout the year. Waterfowl and other game attracted to the lake supplemented the Tachi Yokut diet.

Intensive European exploration of the San Joaquin Valley Yokuts territory did not take place until the early nineteenth century (Wallace 1978). As a result of European contact with Native American populations in the valley, indigenous populations were significantly reduced by disease. Native American settlement patterns within the valley were disrupted because of recruitment for Missions Soledad, San Luis Obispo, San Antonio de Padua, and San Juan Bautista. Further traumatic impacts to the valley's Native American population were caused by a series of parasitic (i.e., malaria) and viral (e.g., influenza) epidemics that began in 1833. The

diseases struck with such virulence that by 1846 an estimated 40–75 percent of Native Americans had died during outbreaks in California (Cook 1955).

Many Southern Valley Yokuts tribes have survived the effects of colonization, particularly the Santa Rosa Rancheria Tachi Yokut Tribe, which has since developed an early childhood education to college success program and has worked to preserve song, dance, and oral history traditions of the Tribe (Golla 2011:154). The Santa Rosa Rancheria Tachi Yokut Tribe is governed by General and Tribal Councils and operates auxiliary departments that serve local Native American populations in areas of governance, healthcare, education, housing, cultural resource management, and administration of the Tachi Palace Hotel and Casino. The Tribe contributes annually to the Kings County fire department, health initiatives, other community welfare programs, and state public use funding programs.

### **2.2.3 Historical Setting**

The first organized Euro-American foray into the western valley occurred in 1806 when Spanish Lieutenant Gabriel Moraga and his men explored stretches of the San Joaquin, Kings, and Kaweah rivers (Cook 1960:247–253). The most relevant exploration was the 1815 travels of Sergeant Juan de Ortega and his band, who camped at a place they called “Chenem” just after crossing the coastal mountains from the Presidio of Monterey (Cook 1960:268). Chenem, which was 32 miles southwest of the Project area, was later occupied and renamed by Mexican settlers, who referred to the place as Posa Chiné or Poso Chané. A 1932 Tulare newspaper article stated:

[At] one time, there were perhaps a dozen Spanish and Mexican families living at the old Posa. They ranged cattle and horses and a few goats. The swamp area was cultivated and they planted trees, vines, and garden truck [Clough and Secrest 1984:40].

In 1854, the Higuera family established a homestead at Posa Chiné/Poso Chané and herded cattle and stock as far as the west shore of Tulare Lake. They likely resided there until 1862–1863 when a flood destroyed the watering hole.

Ranching had been a part of the state’s economy since the Mexican period, and the industry’s growth accelerated as many successful prospectors and businessmen reinvested their profits from the gold rush in cattle and sheep herds. In the early days of ranching, sheep were a valued commodity because they not only could be sold for consumption but could be sheared for their wool. From 1857 to 1871, the amount of wool produced in California increased more than 20-fold, while revenue grew at an average annual rate of 30 percent (Vandor 1919:164). Similarly, cattle provided beef and dairy products as well as hides. Tallow can be rendered from the fat of both cattle and sheep.

In 1850, California gained statehood and the area that was to become Kings County, along with Fresno and several other counties, was part of Mariposa County. Mariposa, truly the “mother of counties,” was the largest county in the state, encompassing more than one fifth of California. Tulare County was formed from parts of Mariposa County in 1852. Kings County, as it exists today, was formed in 1893 from a portion of Tulare County.

### 2.2.3.1 Transportation and Development of Hanford

In 1877 the Southern Pacific Railway (SPR) established the city of Hanford at the site of a small Chinese shepherders' camp. The city was named after SPR executive James Madison Hanford and soon grew into a hub for railway transportation in the southern central valley (Menefee and Dodge 1913:209). As with other towns in the valley, the SPR greatly contributed to Hanford's growth in its early years of existence. City streets were aligned with the passing railroad rather than in cardinal directions (Figure 2-1). Blocks contained 32 lots ready for purchase at inflated rates from the railroad company that was granted rights to the land. While many towns in their early days were located a few blocks off the railroad where land was originally purchased at lower prices, by 1892 the town of Hanford was refocused on the rail line (Preston 1981:123–125). By the early part of the twentieth century, Hanford had a public free library, several churches of various denominations, a fire station, high school, and developed farming districts surrounding the town (Menefee and Dodge 1913:212–216).

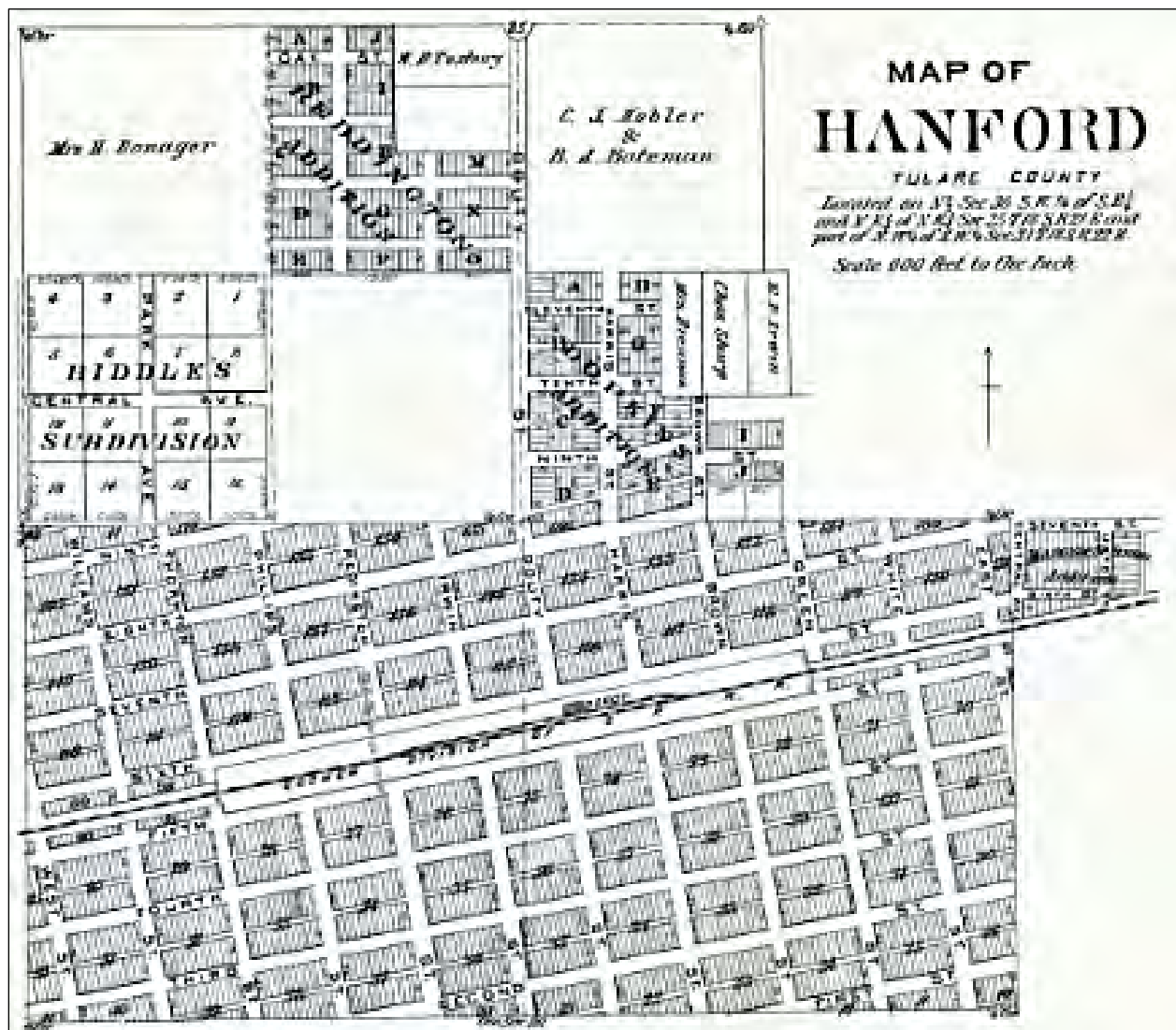


Figure 2-1 City of Hanford circa 1892 showing streets and blocks aligned to the SPR tracks (Thompson 1892:58).

### **2.2.3.2 Agriculture in the Central Valley**

Early settlers in the Tulare Lake basin area encountered hogs left from the Spanish-Mexican era. Hogs were preferred stock over wandering cattle because the animals could be fattened quickly and cuts cured for easy transport (Mitchell 1976:34–37). Large numbers of hogs were fattened in the endless tule reeds surrounding Tulare Lake, then driven to the Sierra foothills in the fall to gorge on ripened acorns (Nordhoff 1874:209). The hog industry helped sustain early Euro-American settlers, whose food supplies otherwise had to be transported by wagon from Stockton (Preston 1981:74–75).

Agriculture had been gathering its own momentum since the gold rush. Early efforts to grow wheat without a sufficient water supply met with failure. Before the 1870s and the advent of large-scale water conveyance systems, farms were generally located near a perennial water source. This constraint on early agriculture kept the valley's two major industries—farming and ranching—in balance within the economy. Competition for real estate was minimized because agricultural interests had little reason to expand into pasturelands that were unsuitable for farming.

By the early 1870s the scales began to tip in favor of agriculture. The construction of extensive irrigation systems, financed by developers like A. Y. Easterby, converted the valley's dry soils into fertile farmlands. The 1874 “no fence” law underscored the growing dominance of agricultural interests and resulted in both operational and monetary repercussions for the sheep and cattle industry:

The “no fence” law obligated the stock owner to herd his cattle and sheep, whereas before the stock roamed at will and was not assembled except for the annual rodeo. He was also made responsible for damage done by his beasts. The farmer was not required to fence his holdings, though. .. he occasionally did so [Vandor 1919:163].

The “no fence” law was a major setback to ranching; the stockman no longer had the entire extent of the San Joaquin Valley at his disposal and was now burdened with the cost of fencing in his herds and flocks. Nevertheless, the industry continued to grow within the county, albeit not at the same pace as agriculture. The cattle empire of Miller and Lux, which operated well into the twentieth century, owned as much as 145,000 acres of pastureland in Madera County (Barcroft 1933) and utilized additional grazing lands within Kings County (Roberts 2008:79).

While much of the valley was covered in wheat fields in the mid-1870s (Clough 1986), farmers had been experimenting with grape vines and citrus trees since the 1850s. By the 1880s, a nationwide glut in the grain market and attendant drop in the price of wheat caused valley farmers to shift their attention to these newer crops. In a relatively short time, large-scale vineyards and orchards had replaced wheat fields in most regions of the valley.

### **2.2.3.3 Water Conveyance**

Irrigation efforts near the city of Hanford began in the area known as “Mussel Slough,” which contained arid dry soils cut by a single slough connecting the Kings River with Tulare Lake. Early settlers saw the potential to irrigate this land before the SPR established a railroad through the area. In 1875, local citizens formed the Peoples Ditch Company and quickly began

construction on an irrigation canal through the heart of Mussel Slough country. Despite many setbacks, such as poor engineering, soft collapsing soils, and lack of capital, the Peoples Ditch canal was completed sometime in 1878 or 1879 (Menefee and Dodge 1913:192–193). A remnant segment of this canal is in the eastern half of the Project area, and a modern realignment of the Peoples Ditch intersects the Project area north–south just below Campus Drive (Figure 1-3).

Water typically has been distributed to farmers primarily at the county level through the water companies of the nineteenth century and more recently by such entities as irrigation districts. By the late 1920s and early 1930s, however, it became apparent to the state government that a valley-wide system was necessary to alleviate local shortages (JRP Historical Consulting Services and California Department of Transportation 2000:73–74). The solution was the Central Valley Project (CVP), a multicomponent water conveyance system that included, among other elements, the Delta-Mendota Canal and the Friant-Kern Canal. Funding for such a massive project was beyond the means of the local water concerns, and the State of California was unable to sell the necessary bond issues due to the monetary constraints of the depression.

The state then turned to the federal government, suggesting a role for construction of the CVP in President Franklin D. Roosevelt’s New Deal. Through a complicated series of negotiations, California officials were finally able to secure federal funding for the project, in part by promoting the project as a major job-creation undertaking—a convincing selling point during the early years of the Great Depression [JRP and Caltrans 2000:74].

Although construction of the CVP began in the late 1930s, labor and material shortages caused by World War II delayed many of the project’s components, and the final stage of construction was not completed until the 1970s.

#### **2.2.3.4 Historical Use and Development of the Project Area**

Numerous archival resources were consulted to identify historical land use and development in the Project area. These resources include General Land Office (GLO) survey plat maps (1855, 1867, and 1891); an 1892 property atlas; USGS topographic quadrangle maps (1926 and 1954); and aerial photographs from 1934, 1937, and 1942.

No historical structures or features (e.g., roads, trails, ditches) are depicted within the Project area on any of the GLO plats examined. Only an intermittent creek (Dry Creek) is shown meandering roughly east–west through the Project area on the 1855 GLO plat (Figure 2-2). However, the property atlas map (Thompson 1892:57) shows that most of the Project area consisted of agricultural land owned by H. F. Schumaker, with smaller portions owned by A. L. Cressey, H. F. Pepys, Mrs. Ada McKelvey, and J. Itin (Figure 2-3). Also depicted is a structure on the Schumaker property within the eastern portion of the Project area, and the Southern Pacific Railroad borders its northern edge. Dry Creek is shown following a southerly course through the Project area. It should also be noted that none of the property owners named above are listed in a contemporary history (Menefee and Dodge 1913) as significant contributors to the growth and development of Kings County.



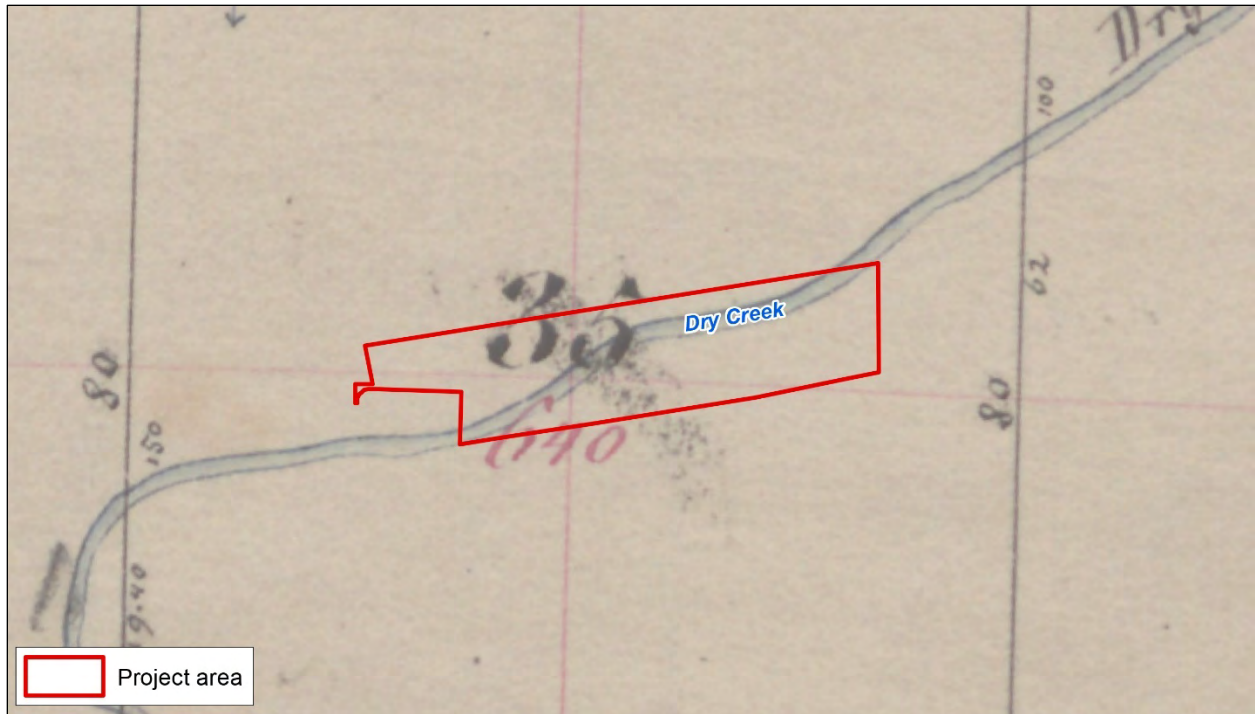


Figure 2-2 Dry Creek present within the Project area prior to irrigation, as depicted on an 1855 GLO Plat.

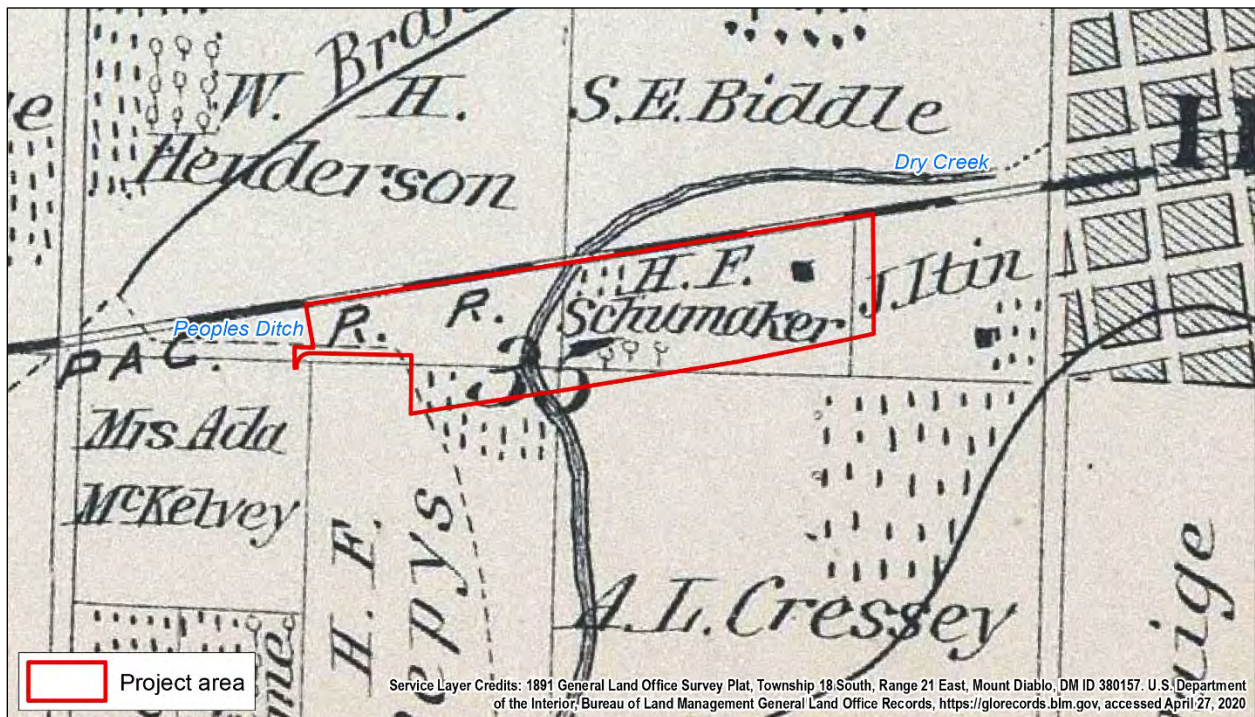
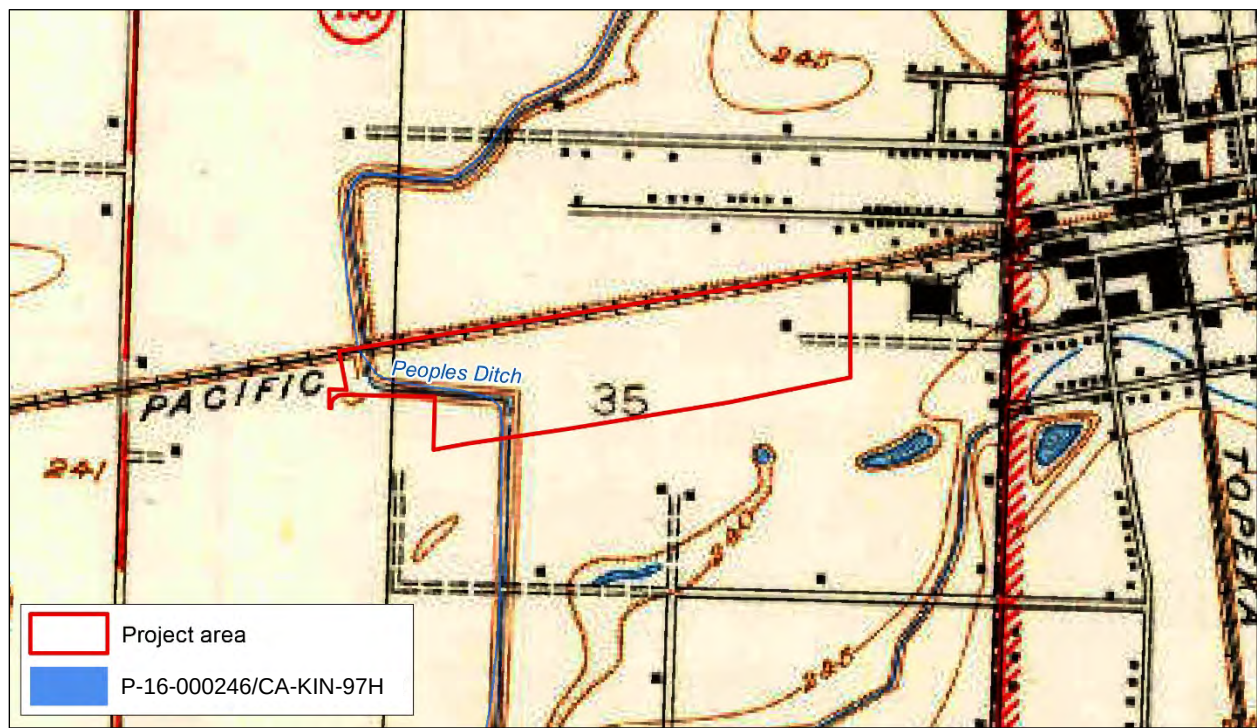


Figure 2-3 Project area on Thompson's 1892 Tulare County property atlas showing the structure on H. F. Schumaker's property.

A 1926 USGS topographic map (Figure 2-4) shows a structure within the Project area at the approximate location of the structure shown on the Schumaker property in 1892. The 1926 map

also depicts a dirt road leading to this structure from the adjacent property to the east (shown as the property owned by J. Itin in 1892; see Figure 2-3) as well as the Peoples Ditch within the western portion of the Project area and the Southern Pacific Railroad bordering its northern edge.



**Figure 2-4** USGS Hanford, California, 1926 topographic map showing location of the structure identified on the 1892 Tulare County atlas and the historical alignment of Peoples Ditch within the Project area.

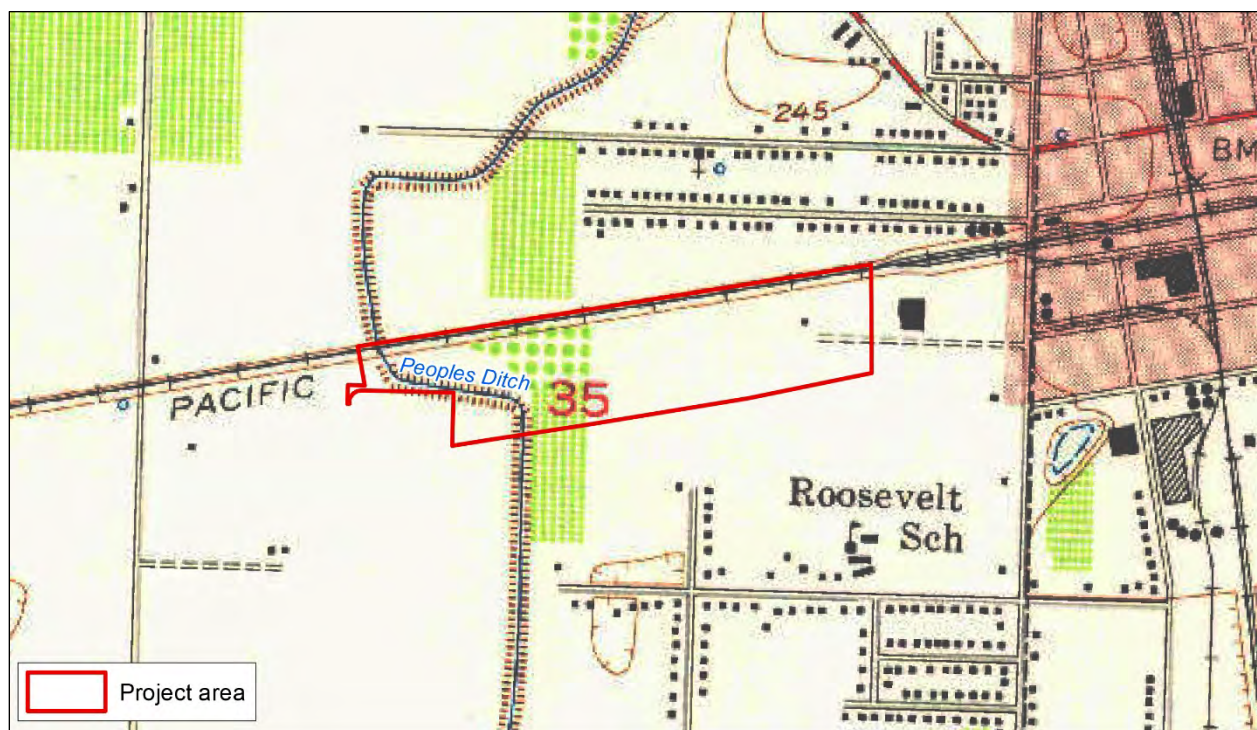
The structure shown within the eastern portion of the Project area in 1892 and 1926, the Peoples Ditch within the western Project area, and the Southern Pacific Railroad to the north continue to be shown at their respective locations on aerial photographs from 1934, 1937 (Figure 2-5), and 1942, as well as on the USGS Hanford, California, 7.5-minute topographic quadrangle photorevised in 1954 (Figure 2-6). No other structures or features are represented within the Project area. These same archival resources show continued use of the Project area as agricultural land throughout these years.

An aerial photograph of the Project area taken in 1976 (Figure 2-7) shows agricultural activity only in the western Project area. The structure in the eastern Project area has been removed by that year. Unfortunately, archival research did not identify maps or aerial images postdating 1954 and predating 1976 that could help refine the timing of when the structure was removed from the property; however, Figure 2-7 does show that the original alignment of Peoples Ditch in the western Project area was still in use in 1976. Archival data indicate that the original alignment of Peoples Ditch was abandoned sometime between 1994 and 2003, when it was realigned to its present configuration within the Project area (see Appendix D).

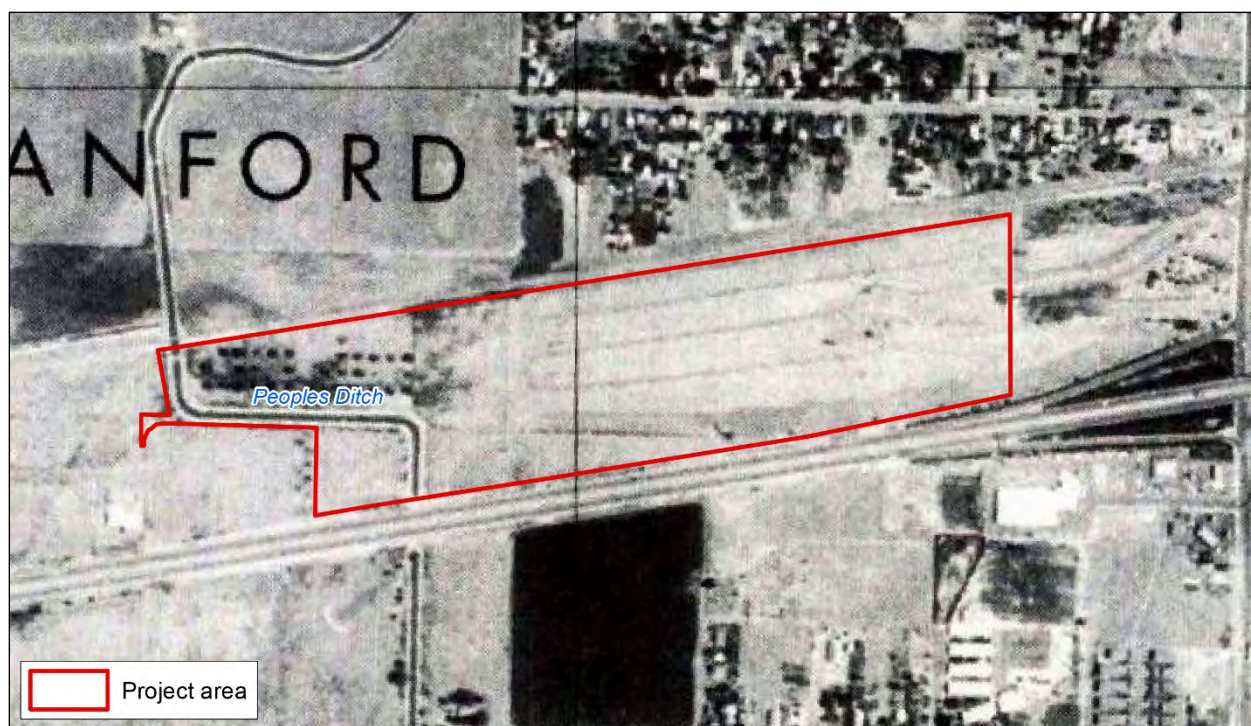




**Figure 2-5** 1937 aerial photo depicting the alignment of the Peoples Ditch, the history-era residence, and the Southern Pacific/San Joaquin Valley Railroad within the Project area.



**Figure 2-6** USGS Hanford, CA 1954 photorevised topographic map showing historical building in eastern portion of the Project area and Peoples Ditch in the western portion.



**Figure 2-7** 1976 aerial photograph demonstrating removal of historical building in the eastern portion of the Project area and the alignment of the Peoples Ditch at that time in the western portion.





## **3 METHODS**

### **3.1 RECORDS SEARCH**

On April 21, 2020, Æ requested a records search of the CHRIS from the SSJVIC at California State University, Bakersfield, to identify previously recorded resources and prior surveys within the Project area and surrounding 0.5-mile area. SSJVIC staff examined site records, files, and maps, and completed searches of the Historic Property Data File, National Register of Historic Places, California Register of Historical Resources, and California Historical Resources databases.

### **3.2 ARCHIVAL RESEARCH**

The purpose of archival research is to provide information regarding the history of land use and to assess the potential for prehistoric and historic-era archaeological deposits within the Project area. Æ's investigation compiled information from several sources, including:

- Map and Aerial Locator Tool (MALT) (<http://malt.library.fresnostate.edu/MALT/>);
- U.S. Geological Survey TopoView (<https://ngmdb.usgs.gov/topoview/>);
- GLO survey plats (<https://gloreCORDS.blm.gov/default.aspx>); and
- Æ's in-house library, which includes maps and local histories.

### **3.3 NATIVE AMERICAN OUTREACH**

On April 21, 2020, Æ requested that the Native American Heritage Commission (NAHC) conduct a search of its Sacred Lands File to identify previously recorded sacred sites or cultural resources of special importance to tribes and provide contact information for local Native American representatives who may have information about the Project area. The NAHC responded on April 22, 2020, with its findings and attached a list of Native American tribes and individuals culturally affiliated with the Project area. On August 5, 2020, Æ mailed an outreach letter to each of the contacts identified by the NAHC and kept a log of all responses (Appendix C). The outreach letter and follow-up calls are considered best practices within cultural resource management. Æ's outreach efforts thus do not qualify as CEQA Assembly Bill 52 government-to-government consultation, which would be the responsibility of the CEQA lead agency (City of Hanford).

### **3.4 BURIED SITE SENSITIVITY ASSESSMENT**

Æ conducted a geologic and hydrologic review of the Project area to assess the potential for paleosols that may contain intact prehistoric cultural deposits. Æ consulted geological maps, historical maps, the U.S. Department of Agriculture Natural Resources Conservation Service

Web Soil Survey online database, and regional geoarchaeological studies (e.g., Meyer et al. 2010). These sources provided information regarding the natural watercourses in the area as well as data about local soils and sediments, parent rock formations, and historical vegetation. This information was used to estimate the age of the sediments surrounding the study area, consider the hydrologic and geologic forces that created and placed these sediments, and assess the likelihood of encountering buried cultural resources within the vertical Project area during proposed construction activity as described in a preliminary geotechnical investigation report for the Project area (AhTye et al. 2020).

### **3.5     ARCHAEOLOGICAL SURVEY**

On May 23 and 24, 2020, Æ Staff Archaeologist Ward Stanley conducted an intensive archaeological pedestrian survey of the entire Project area. Stanley used parallel transects spaced 15–20 meters apart and took photographs of the area using an iPhone 11 camera. Methods and observations were recorded on Æ Daily Work Record and Survey Field Record forms. Stanley used a Trimble Global Positioning System (GPS) unit to collect geospatial data. All photographs and field notes are on file at Æ's Fresno office.

#### **3.5.1     Documentation of Cultural Resources**

Æ recorded cultural resources by first establishing a site boundary that encompasses the distribution of artifacts across the ground surface and then examining potentially temporal diagnostic artifacts to establish the general age of the resource (e.g., prehistoric, historic, post-World War II, modern). A few artifacts were then collected from the ground surface and transported to the Æ laboratory in Fresno to confirm the age of the resource using Æ library resources and historic artifact guides. All collected artifacts were placed in archival bags labeled with provenience information, which included Project number, site number, Universal Transverse Mercator coordinates, date of collection, and surveyor's initials. The resources were then recorded on California Department of Parks and Recreation Primary Record and Location Map forms.

## 4 FINDINGS

### 4.1 RECORDS SEARCH RESULTS

The SSJVIC responded to Æ's records search request on May 5, 2020 (Records Search File No. 20-168). The SSJVIC reported nine previous cultural studies encompassing portions of the Project area that occurred between 1982 and 2015, and five additional studies in the surrounding 0.5-mile area (see Appendix B). Of the nine studies within the Project area, seven had negative results. The Peoples Ditch (P-16-000246/CA-KIN-97H) is the only previously recorded resource within the Project area. The Southern Pacific Railroad/San Joaquin Valley Railroad (P-16-000122/CA-KIN-177H) is just outside the Project area's northern boundary. Two additional built environment resources, the Burlington North and Santa Fe Railway (P-16-000120) and a Craftsman bungalow (P-16-000205) are within a 0.5-mile radius of the Project area (Appendix B).

Æ's in-house cultural resource database revealed that one additional resource, the Kingsburg-Lemoore transmission line, is also within 0.5 miles of the Project area.

### 4.2 ARCHIVAL RESEARCH

The desktop research resulted in key historical information presented in Section 2.2.3. Specific sources of map and aerial images consulted during archival research are identified in Appendix B.

### 4.3 NATIVE AMERICAN OUTREACH

The NAHC responded to Æ's request on April 22, 2020, and stated that its search of the Sacred Lands File did not identify any known cultural resources that could have special importance to Native American groups within the Project area or surrounding 0.5-mile area. However, the NAHC cautioned that the absence of information in the Sacred Lands File does not indicate the absence of Native American cultural resources within the Project area (see Appendix C). The NAHC supplied a list of Native American representatives to be contacted for information regarding sacred or special sites of cultural and spiritual significance in the Project area and surrounding 0.5-mile area, including:

- Stan Alec of the Kings River Choinumni Farm Tribe;
- Chairperson Leo Sisco of the Santa Rosa Rancheria of Tachi Yokut Tribe;
- Cultural Resource Director Bob Pennell of the Table Mountain Rancheria;
- Chairperson Neil Peyron of the Tule River Indian Tribe;
- Chairperson Kenneth Woodrow of the Wuksache Indian Tribe/Eshom Valley Band;
- and

- Chairperson Leanne Walker-Grant of the Table Mountain Rancheria.

On August 5, 2020, Æ sent a letter describing the Project to each of the Native American representatives identified above. Follow-up contact by email and telephone was completed on August 13, 2020. No responses have been received to date.

#### **4.4 BURIED SITE SENSITIVITY ASSESSMENT**

This section assesses the potential for the proposed Project to impact intact buried archaeological deposits in the Project area and identifies the conditions that may affect preservation of cultural materials, should any exist. Estimating the general sensitivity of soils to contain buried archaeological material is based on various factors, including the Project area's distance from water, age of geological deposits, landform, river formation patterns, ground slope, and soil types within the Project area and their respective characteristics (Rapp and Hill 2006; Waters 1992). In general, the potential for buried prehistoric resources increases with proximity to natural watercourses.

Geologic and soil data derived from the National Resources Conservation Service Web Soil Survey identify only one soil type within the Project area, consisting of Nord coarse to fine sandy loam. In general, the Nord series has high to very high sensitivity for containing paleosols with intact cultural deposits. Nord sandy loam soil consists of mixed alluvium formed from decomposed granite and sedimentary rock. These soils are found on alluvial fan remnants and floodplains with a slope between 0 and 2 percent. The soil type likely spans the Early to Late Holocene. It is a very deep (i.e., extending 35 feet below the ground surface), well-drained soil with variable salinity and low clay content that supports native grasses, herbs, and white oak (*Quercus lobata*) (Soil Survey Staff 1999). A geotechnical investigation prepared for the Project area described the soil within 10 feet below the ground surface level as having the potential for hydrocompaction (liquefaction) when exposed to moisture (AhTye et al. 2020:18).

Alluvial fan landforms are typically environments with high potential to contain anthropogenic paleosols, particularly near streams where the effects of continuous high-velocity helical water flow are comparatively less than is observed commonly in larger rivers. However, subsurface conditions composed of well-drained highly saline soils tend to only moderately preserve bone, teeth, and other organic materials (Schiffer 1987). Saline introduced into cultural deposits via groundwater percolation, which is common in agricultural areas, may contribute to an accelerated rate of decay of certain artifact classes. Metals and other porous materials would be most susceptible to corrosion resulting from saline-rich groundwater percolation, particularly with increasing acidic conditions (Kibblewhite et al. 2015; Rapp and Hill 2006). Yet, improved preservation of cultural deposits is expected below the hardpan, as the decomposing effects of excessive water percolation are slowed (Kibblewhite et al. 2015). Thus, the possibility of encountering moderately or well-preserved cultural deposits within the vertical Project area increases with depth. Therefore, the potential for encountering a well-preserved anthropogenic paleosol would be greatest where the hardpan would be encompassed by the vertical Project area. However, moderately preserved and intact cultural deposits could be encountered in any paleosol above the hardpan. An important concept to understand is that even poor to moderately preserved cultural remains may be eligible for listing in the California Register of Historical Resources or National Register of Historic Places.

In conclusion, the entire Project area is encompassed by a soil type and landform that have high or very high potential for containing anthropogenic paleosols with intact cultural deposits. Adding to this sensitivity is the presence of Dry Creek within the Project area during prehistory, which would have provided rich habitat and other resources for Native American groups. Dry Creek was a naturally occurring intermittent stream that was modified during Hanford's early settlement period (see Figure 2-2). However, as can be seen in historical GLO plats, atlases, and aerial images, it is likely that portions of the Project area have been disturbed by past infill of Dry Creek and the construction of Peoples Ditch in addition to impacts related to historic-era agricultural and domestic activities in the eastern portion of the Project area. In these areas of disturbance, the sensitivity for intact and well-preserved buried sites is moderate, low, or none.

This evidence of modern disturbance notwithstanding, due to the very high sensitivity of the soil type in the Project area, and because overexcavation and recompaction of soil is recommended to mitigate the effects of potential hydrocompaction "to at least 7 feet below the existing grade and to a distance of at least 10 feet beyond the perimeter of the planned buildings and surrounding improvements" (AhTye et al. 2020:21), limited subsurface archaeological testing to confirm the presence/absence of anthropogenic paleosols or intact cultural resource deposits is recommended. Based on the findings of subsurface archaeological testing, archaeological data recovery to assess prehistoric cultural deposits and cultural resource monitoring during ground disturbing construction activities may be needed.

## **4.5 ARCHAEOLOGICAL SURVEY FINDINGS**

### **4.5.1 Visibility**

The Project area is primarily utilized for agricultural purposes. As a result, the landscape is relatively flat and unobscured by pavement or buildings. At the time of survey, the ground surface within the Project area afforded 90–100 percent visibility (Figure 4-1). Isolated patches of dead grass obscured ground visibility in some areas. Moderate amounts of modern trash were encountered throughout the Project area. The inner bank of the modern alignment of Peoples Canal was obscured by dense vegetation and had no ground visibility. The canal bottom had excellent visibility (90–100 percent; Figure 4-2). A small portion of the Project area in the southwest corner was enclosed by a chain-link fence and was not accessible for survey (Figure 4-3).

### **4.5.2 Archaeological Resources**

Æ archaeologists surveyed all accessible portions of the Project area, totaling 42.82 acres of intensive coverage, or approximately 99 percent of the total Project area (Figure 4-3). The southeastern corner of the Project area was inaccessible behind a secured fence and could not be surveyed. The portion not surveyed comprised less than 1 acre and was less than 1 percent of the Project area.

Field staff observed one historic-era refuse scatter (AE-4167-01) and one historic-era isolate (AE-4167-ISO-01). AE-4167-01 is a large historical refuse scatter extending across 6 acres in the northeast section of the Project area. Cultural constituents include glass of various colors, broken bottles, ceramic fragments, insulators, wood fragments, bricks, river cobbles with cement mortar attached, heavy metal pipe fragments, miscellaneous metal fragments, a toy marble, and a bottle



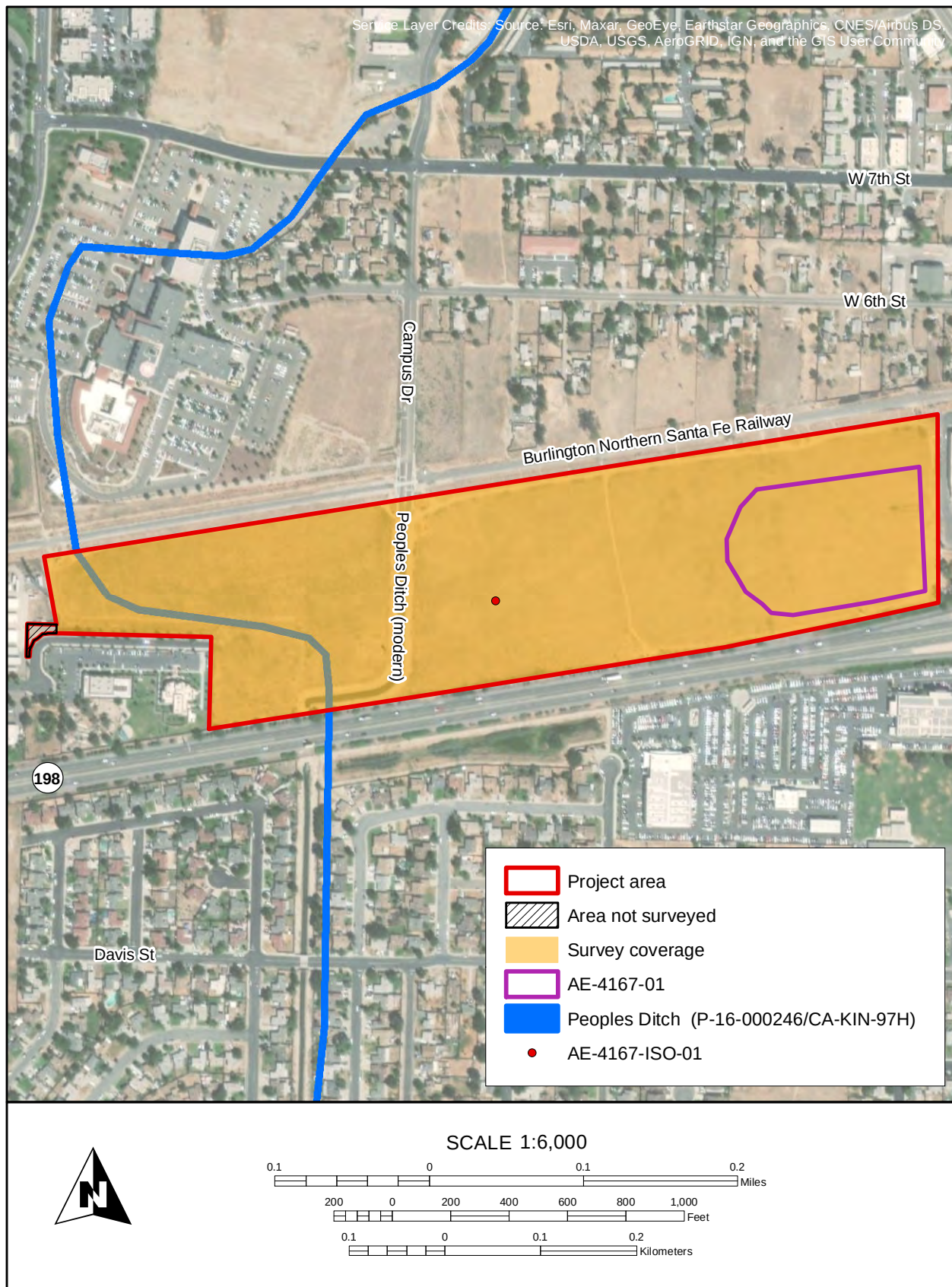


**Figure 4-1** Survey conditions from the center of the Project area showing 100 percent ground surface visibility, facing west.



**Figure 4-2** Survey conditions within and along the modern alignment of Peoples Ditch, facing north.

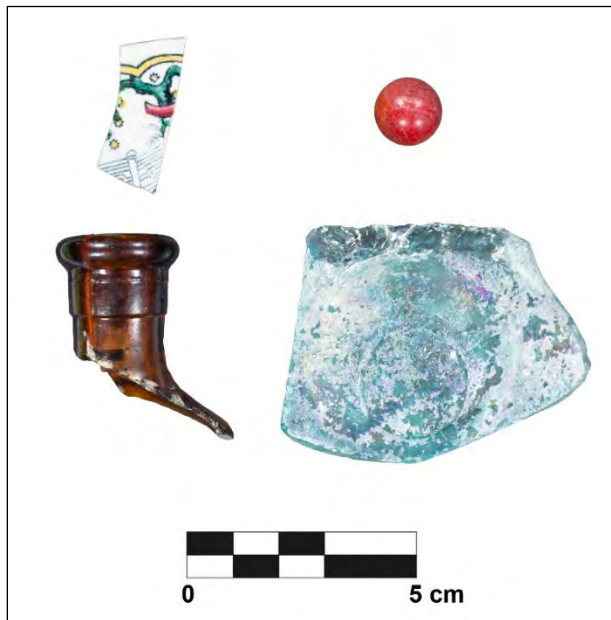




**Figure 4-3 Survey coverage and cultural resources in the Project area.**

base fragment showing pressure flaking along one edge. A total of 12 temporally diagnostic artifacts were identified; a sample of these are presented in Figure 4-4. The artifacts date to the first half of the twentieth century, suggesting the deposit may be associated with the nonextant historical structure visible on historic-era GLO plats, historical atlas maps, and aerial images. The site appears to have been impacted by previous agricultural activity that would have displaced artifacts within a few feet of their original placement. The condition of the subsurface deposit is unknown as it was not visible during the pedestrian survey.

AE-4167-ISO-01 is an aqua blue glass insulator fragment that was observed approximately 800 feet west of AE-4167-01 (Figure 4-5).



**Figure 4-4** Various glass and ceramic artifact fragments and a toy marble from historic site AE-4167-01.



**Figure 4-5** Detail view of historical glass insulator fragment (isolated artifact AE-4167-ISO-01).

No prehistoric artifact concentrations, isolated artifacts, features, or evidence of human skeletal material were observed during the survey.

#### **4.5.3 Built Environment Resources**

A modern segment of Peoples Ditch (P-16-000246/CA-KIN-97H) and the remnants of its older, now abandoned, route were observed during survey (Figure 4-6). Æ updated the site record to reflect the current condition of the historic-era remnant portion (Appendix D).

The Peoples Ditch was constructed in the 1870s by the Peoples Ditch Company to divert water from the Kings River to agricultural operations in the southern San Joaquin Valley and is still in use today (Jones 2017). According to Google Earth imagery, the historical segment of Peoples Ditch that intersects the Project area was abandoned sometime between 1994 and 2003, along with a segment north of the railroad, west of Campus Drive. At that time, Peoples Ditch was realigned and piped under Campus Drive and the railroad tracks for approximately 1,660 feet. It





**Figure 4-6** Remnant scar of historical Peoples Ditch within survey area, facing east.

resurfaces in the Project area just south of the railroad track and continues to flow south in a J-shaped configuration between the railroad and State Route 198, east of its original alignment, before returning to its historical alignment at State Route 198 (see Figure 4-3). This new segment is less than 50 years old. The only remaining evidence of the original alignment of the ditch is its scar on the landscape and the remains of a concrete containment well at the northern end of the abandoned segment.





## 5 SUMMARY AND RECOMMENDATIONS

Æ provided cultural resource services for the Hanford Place Medical and Mixed-Use Property Project in Kings County, California. The Hanford Group proposes to build 15 structures that would be utilized for medical outpatient clinic services, hospitality, specialized education, retail, medical offices, skilled nursing and assisted living facilities, and multifamily housing. Ground disturbance resulting from proposed Project activities would include grading; trenching for installation of water, sewer, and electrical infrastructure; construction of a roundabout and buildings, structures, and facilities; and excavation of a storm water retention basin. Thus, the proposed Project requires compliance with CEQA.

Under contract to Epic Management Group, Inc., Æ conducted a cultural resource inventory of the Project area to determine if historical resources are present within the Project area. Accordingly, Æ performed background research, obtained a records search from the SSJVIC of the CHRIS, requested a search of the NAHC Sacred Lands File, contacted local Native American representatives identified by the NAHC for outreach purposes, assessed the sensitivity of the Project area for containing paleosols that have potential to contain buried archaeological deposits, and conducted an intensive pedestrian survey of the Project area.

The SSJVIC reported that nine previous cultural resource studies encompassing portions of the Project area occurred from 1981 to 2015, and five additional studies were completed in the surrounding 0.5-mile. The Peoples Ditch (P-16-000246/CA-KIN-97H) is the only previously recorded resource within the Project area. Four additional built environment resources were reported within a 0.5-mile of the Project area (Appendix B). The NAHC's Sacred Lands File search did not identify sacred places within the Project area, and Æ did not receive comments from Native American representatives identified by the NAHC. The buried site sensitivity assessment of the vertical Project area revealed high sensitivity for the presence of anthropogenic paleosols containing buried sites in areas of the Project that have not been disturbed previously by historic-era construction of the People's Ditch or its modern realignment, or by agricultural activities occurring at depths less than 24 inches below the ground surface. Æ's pedestrian survey of the Project area resulted in the identification of one historic-era refuse scatter (AE-4167-01), one historical isolated artifact (AE-4167-ISO-01). Æ additionally updated the existing California Department of Parks and Recreation cultural resource record for the Peoples Ditch to record its remnant historical alignment within the Project area.

To fully comply with CEQA and determine if the Project would cause a substantial adverse change in the significant qualities of a historical resource, Æ recommends additional mapping and subsurface testing of AE-4167-01 to evaluate its eligibility for inclusion in the California Register of Historical Resources, pursuant to California PRC 5024.1. Additional focused subsurface testing in areas not previously disturbed by historic-era activities is recommended to confirm presence/absence of high-sensitivity paleosols that may include intact prehistoric cultural deposits. If intact prehistoric cultural deposits are encountered during subsurface presence/absence testing, Æ recommends further investigation to determine if the deposit retains

integrity and is eligible for inclusion in the California Register of Historical Resources. The methods and findings of the additional studies would be presented as an addendum to this report and would include cultural resource management recommendations to guide mitigation of potential adverse effects to any identified historical resources within the Project area.

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## **APPENDIX A**

### **Personnel Qualifications**



### Areas of Expertise

- Cultural resource management
- Ethnography
- Tribal consultation
- Zooarchaeological, paleoethnobotanical, and lithics analysis

### Years of Experience

- 20

### Education

Ph.D. candidate, Anthropology/  
Feminist Studies, University of  
California, Santa Barbara

M.A., Anthropology (Archaeology/  
Cultural Resource Management  
emphasis), University of California,  
Santa Barbara, 2010

B.A., Anthropology, University of  
California, Santa Barbara, 2002

A.A., Liberal Arts and Sciences,  
Ventura College, 1999

### Registrations/Certifications

- Registered Professional  
Archaeologist 39362477

### Permits/Licensure

- Principal Investigator, California  
BLM Statewide Cultural  
Resources Use Permit CA-18-22

### Professional Affiliations

- American Anthropological  
Association
- American Cultural Resources  
Association
- Santa Barbara Museum of Natural  
History
- Society for American Archaeology
- Society for California Archaeology
- World Archaeological Congress

### Professional Experience

- |           |                                                                                                        |
|-----------|--------------------------------------------------------------------------------------------------------|
| 2018–     | Senior Archaeologist, Applied EarthWorks, Inc., Fresno, California                                     |
| 2015–2018 | Interim Cultural Resources Supervisor and Senior Archaeologist/Ethnographer, Aspen Environmental Group |
| 2007–2009 | Archaeologist (GS-9), U.S. Department of Agriculture, Los Padres National Forest                       |
| 2005–2007 | Archaeologist (GS-7), U.S. Department of Agriculture, Los Padres National Forest                       |
| 2004–2005 | Archaeological Contractor, Padre, Inc., Ventura, California                                            |
| 2000–2005 | Archaeologist (GS-4/5), U.S. Department of Agriculture, Los Padres National Forest                     |

### Technical Qualifications

Ms. Dyste has 20 years of experience in cultural resources management and meets the Secretary of the Interior's qualification criteria as an archaeologist. She has extensive experience preparing environmental documents and managing complex projects pursuant to applicable federal, state, and local regulations. Her work includes senior review or prime authorship of cultural resources documents for National Historical Preservation Act Section 106, National Environmental Policy Act, and California Environmental Quality Act compliance, including public and tribal comment and response; development of research designs; design and implementation of cultural resources plans. Ms. Dyste is qualified to conduct archaeological survey, including the supervision of small to large sized field crews, as well as zooarchaeological, paleoethnobotanical, lithics, and ethnographic analyses. She is able to analyze cultural spatial patterns via use of Total Station and Geographic Information Systems software. Ms. Dyste's Assembly Bill 52 and NHPA Section 106 tribal consultation services are informed by her knowledge and training in Native American jurisprudence, cultural sensitivity training, and graduate seminars in Native American environmental law, indigenous research methodologies, and community-based Participatory Action Research with tribal and special interest groups. She has project experience in coastal, highlands, grasslands, desert, and remote mountain settings across the state of California, although her academic region of specialty is in central and southern California with a focus on Salinan, Esselan, northern/interior/coastal Chumash prehistoric and modern political tribal groups. Ms. Dyste is a native Spanish speaker and assists clients with the translation of English to Spanish signage and public notices.

## Areas of Expertise

- Geographic Information Systems (GIS) in archaeology
- Computer-generated maps and graphics
- Archaeological survey and excavation

## Years of Experience

- 7

## Education

B.A., Anthropology, California State University, Sacramento, 2013

Archaeological Technician Certificate, Anthropology Department, Fresno City College, Fresno, California, 2011

## Affiliations

Society for California Archaeology

## Professional Experience

- |           |                                                                                                            |
|-----------|------------------------------------------------------------------------------------------------------------|
| 2020–     | Staff Archaeologist/Project Manager, Applied EarthWorks, Inc. Fresno, California                           |
| 2017–     | Staff Archaeologist/GIS Specialist, Applied EarthWorks, Inc. Fresno, California                            |
| 2015–2017 | Geographic Information Systems (GIS) Technician, Applied EarthWorks, Inc., Fresno, California              |
| 2012–2013 | Laboratory Technician (volunteer), Archaeological Research Center, California State University, Sacramento |
| 2009–2010 | Laboratory Technician (volunteer), Fresno City College, Fresno, California                                 |

## Technical Qualifications

As a Staff Archaeologist, Ms. Jones performs Native American outreach, archival research, pedestrian archaeological and built environment survey, site recordation and evaluation, and partakes in archaeological excavation for projects throughout the Central Valley and Sierra Nevada foothills. She serves as a primary author or contributor for cultural resource inventory reports and is experienced in the preparation of California Department of Parks and Recreation (DPR) cultural resource record forms (523 series) and California Department of Transportation cultural resource documents. Ms. Jones has managed several water infrastructure improvement projects in the Central Valley and has working knowledge of Section 106 of the National Historic Preservation Act and California Environmental Quality Act regulatory frameworks. Her expertise also includes work as a Geographic Information Systems (GIS) technical specialist. She has extensive experience as a cartographer and spatial data manager for large and small projects involving both prehistoric and historic-era built environment cultural resources, particularly linear resources such as historic-era canal systems and related pumps, basins, and other components. Ms. Jones is a critical component of Æ's digital technology program, responsible for instructing cultural and paleontological staff in the use of ESRI ArcGIS software. Her background also includes extensive experience volunteering in archaeological repositories where she gained expertise in laboratory processing, cataloging, and management of archaeological collections.



## Areas of Expertise

- California archaeology—Sierra Nevada
- Survey, excavation, and Geographic Information System applications
- Project administration support

## Years of Experience

- 10

## Education

B.A., Kansas State University, 2008

## Permits/Licensure

- Field Director, California BLM Statewide Cultural Resources Use Permit CA-18-22

## Registrations/Certifications

Wildland Firefighter Qualified (Arduous)

## Professional Experience

- |           |                                                                                                    |
|-----------|----------------------------------------------------------------------------------------------------|
| 2015–     | Staff Archaeologist, Applied EarthWorks, Inc., Fresno, California                                  |
| 2011–2017 | Archaeological Field Technician/Crew Supervisor, Sierra National Forest and Lassen National Forest |
| 2009–2011 | Archaeological Field Technician/Crew Supervisor, Malheur National Forest                           |
| 2008–2009 | Archaeological Field Technician, Plumas National Forest                                            |

## Technical Qualifications

Mr. Stanley's archaeological experience includes survey, archaeological testing, data recovery excavation, and documentation of both prehistoric and historical resources in the Central Valley and Sierra National Forest in California. He has supervised field crews for several large-scale projects for the Sierra, Lassen, and Malheur National Forests. This work included prefield research, pedestrian survey, site recording, and report preparation. Mr. Stanley is knowledgeable about Section 106 of the National Historic Preservation Act and associated regulations and processes; he also has experience working with local Native American tribes. He is well versed in the use of Geographic Information System (GIS) applications, including those for data gathering and modeling, and has prepared maps using ESRI ArcGIS software for use in technical reports and in the field. In addition to working for the Sierra National Forest, he has served as lead archaeological resource advisor on three separate wildland fires and was responsible for coordinating protection of archaeological resources from suppression efforts. Additionally, he produced assessment damage reports for all fires. For Applied EarthWorks, Mr. Stanley has served as field supervisor for implementation of the Crane Valley Hydroelectric Power Project Historic Properties Management Plan, which includes monitoring of impacts to resources and implementing management measures to avoid or minimize adverse effects to historic properties within the Crane Valley Archaeological District.

## Areas of Expertise

- Cultural Resource Management
- Architectural History
- Historic Preservation

## Years of Experience

- 8

## Education

Ph.D. candidate, Architectural History, Utrecht University, 2013–present

M.A., Architectural History and Historic Preservation, Utrecht University, 2010–2011

B.A., Art History, Utrecht University, 2007–2010

## Professional Experience

|           |                                                                                       |
|-----------|---------------------------------------------------------------------------------------|
| 2019–     | Senior Architectural Historian, Applied EarthWorks, Inc., Fresno, California          |
| 2017–2019 | Editor/Translator, SDI Media, Los Angeles, California                                 |
| 2016–2017 | Subcontractor, GPA Consulting, Los Angeles, California                                |
| 2015–2016 | Project Manager, City of Amsterdam, The Netherlands                                   |
| 2014–2015 | Visiting Scholar, Columbia University, New York                                       |
| 2011–2014 | Advisor on Cultural History and Urban Development, City of Amsterdam, The Netherlands |
| 2010–2011 | Intern, Amsterdam Centre for Architecture, The Netherlands                            |

## Technical Qualifications

Mr. van Onna has been involved in cultural resources management since 2011. His areas of expertise include built environment investigations, preparation of historic resource evaluation reports, and other required documentation for cultural resource management projects. As a Senior Architectural Historian for Applied EarthWorks, Mr. van Onna meets the Secretary of the Interior's professional qualification standards in architectural history. He has prepared technical reports for historical built environment resources to satisfy compliance requirements under the National Historic Preservation Act (NHPA) Section 106 and the California Environmental Quality Act (CEQA), including significance evaluations and eligibility recommendations for inclusion in the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR). Mr. van Onna has previously worked for the City of Amsterdam, The Netherlands, coordinating its Municipal Landmarks Project and completing numerous built environment surveys, studies, and historical significance assessments for environmental impact reports, zoning plans, and other policy documents. At Applied EarthWorks, he provides guidance and assistance to project managers and staff alongside his core tasks as an architectural historian. Additional skills include archival research, architectural photography, editing, and quality assurance. Through his pursuit of a doctoral degree at Utrecht University, he explores the role of historic preservation in urban public spaces in the United States.

## **APPENDIX B**

### **Records Search Results**

\*Archaeological site location information is exempt from the Freedom of Information Act (FOIA) and California Public Records Act (CPRA).





5/5/2020

Diana Dyste  
Applied Earthworks, Inc.  
1391 W. Shaw Ave., Suite C  
Fresno, CA 93711

Re: Hanford Place Medical and Mixed-Use Property Project in the City of Hanford  
Records Search File No.: 20-168

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on the Hanford USGS 7.5' quad. The following reflects the results of the records search for the project area and the 0.5 mile radius:

As indicated on the data request form, the locations of resources and reports are provided in the following format: ☐ custom GIS maps ☒ shapefiles

|                                   |                                                                  |
|-----------------------------------|------------------------------------------------------------------|
| Resources within project area:    | P-16-000122, 000246                                              |
| Resources within 0.5 mile radius: | P-16-000120, 000205                                              |
| Reports within project area:      | KI-00028, 00042, 00093, 00100, 00109, 00111, 00238, 00268, 00269 |
| Reports within 0.5 mile radius:   | KI-00079, 00094, 00110, 00192, 00310                             |

**Resource Database Printout (list):** ☒ enclosed ☐ not requested ☐ nothing listed

**Resource Database Printout (details):** ☒ enclosed ☐ not requested ☐ nothing listed

**Resource Digital Database Records:** ☒ enclosed ☐ not requested ☐ nothing listed

**Report Database Printout (list):** ☒ enclosed ☐ not requested ☐ nothing listed

**Report Database Printout (details):** ☒ enclosed ☐ not requested ☐ nothing listed

**Report Digital Database Records:** ☒ enclosed ☐ not requested ☐ nothing listed

**Resource Record Copies:** ☒ enclosed ☐ not requested ☐ nothing listed

**Report Copies:** ☒ enclosed ☐ not requested ☐ nothing listed

*Note: PDFs for "Other" Reports were omitted, per the Data Request Form*

**OHP Built Environment Resources Directory:** ☒ enclosed ☐ not requested ☐ nothing listed

**Archaeological Determinations of Eligibility:** ☐ enclosed ☐ not requested ☒ nothing listed

**CA Inventory of Historic Resources (1976):** ☐ enclosed ☐ not requested ☒ nothing listed



**Caltrans Bridge Survey:** Not available at SSJVIC; please see  
<http://www.dot.ca.gov/hq/structur/strmaint/historic.htm>

**Ethnographic Information:** Not available at SSJVIC

**Historical Literature:** Not available at SSJVIC

**Historical Maps:** Not available at SSJVIC; please see  
<http://historicalmaps.arcgis.com/usgs/>

**Local Inventories:** Not available at SSJVIC

**GLO and/or Rancho Plat Maps:** Not available at SSJVIC; please see  
<http://www.glorerecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=1> and/or  
<http://www.oac.cdlib.org/view?docId=hb8489p15p;developer=local;style=oac4;doc.view=items>

**Shipwreck Inventory:** Not available at SSJVIC; please see  
<http://www.slc.ca.gov/Info/Shipwrecks.html>

**Soil Survey Maps:** Not available at SSJVIC; please see  
<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Invoices for Information Center services will be sent under separate cover from the California State University, Bakersfield Accounting Office.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

**Celeste M. Thomson** Digitally signed by Celeste M. Thomson  
Date: 2020.05.05 12:34:07 -07'00'

Celeste M. Thomson  
Coordinator

## Resource List

SSJVIC Record Search 20-168

| Primary No. | Trinomial      | Other IDs                                                                                                                               | Type            | Age      | Attribute codes | Recorded by                                                                                                                                                                      | Reports                      |
|-------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| P-16-000120 |                | Resource Name - Burlington Northern and Santa Fe Railway (formerly Atchison, Topeka, and Santa Fe);<br>Resource Name - CRM TECH 607-7H  | Structure       | Historic | AH07            | 2001 (Bai "Tom" Tang, Daniel Ballester, CRM Tech)                                                                                                                                |                              |
| P-16-000122 | CA-KIN-000117H | Resource Name - San Joaquin Valley Railroad, Southern Pacific Railroad                                                                  | Structure, Site | Historic | AH07; HP37      | 2001 (Bai "Tom" Tang, CRM Tech);<br>2013 (A. Gardner, L. Bennett, S. Lewis, Far Western Anthropological Research Group, Inc.);<br>2017 (Jessica Jones, Applied EarthWorks, Inc.) | KI-00109, KI-00245, KI-00310 |
| P-16-000205 |                | Resource Name - 10130 Seventh Avenue, Hanford Vicinity, Kings County;<br>OHP Property Number - 127866;<br>OTIS Resource Number - 570326 | Building        | Historic | HP02            | 1999 (Douglas W. Dodd, Caltrans District 6)                                                                                                                                      |                              |
| P-16-000246 | CA-KIN-000097H | Resource Name - JKI-002;<br>Resource Name - People's Ditch;<br>OTIS Resource Number - 666092                                            | Structure       | Historic | HP20            | 2001 (Bai "Tom" Tang, Daniel Ballester, CRM TECH);<br>2009 (Joseph Freeman, Jarma Jones, JRP Historical Consulting, LLC);<br>2017 (Jessica Jones, Applied EarthWorks, Inc.)      | KI-00196, KI-00310           |

## Report List

### SSJVIC Record Search 20-168

| Report No. | Other IDs                                                                                         | Year | Author(s)                                                                   | Title                                                                                                                                                                                   | Affiliation                                                       | Resources                                                                              |
|------------|---------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| KI-00028   | NADB-R - 1140863                                                                                  | 1995 | Hatoff, Brian, Voss, Barb, Waechter, Sharon, Benté, Vance, and Wee, Stephen | Cultural Resources Inventory Report for the Proposed Mojave Northward Expansion Project                                                                                                 | Woodward-Clyde Consultants                                        | 16-000067, 16-000068                                                                   |
| KI-00042   |                                                                                                   | 1981 | O'Connor, Denise and Clayton, A.B.                                          | Archaeological Survey Report for an Interchange at 12th Avenue on Route 198, Kings County 06-KIN-198, R16.4/R17.4 06100-178200                                                          | Caltrans                                                          |                                                                                        |
| KI-00079   |                                                                                                   | 1998 | Price, Barry A.                                                             | Cultural Resources Assessment for Pacific Bell Mobile Services Facility CV-503-01                                                                                                       | Applied EarthWorks Inc.                                           |                                                                                        |
| KI-00093   |                                                                                                   | 2000 | Ryan, Christopher                                                           | Supplemental Archaeological Survey for te Laguna Irrigation District Transmission Line Improvement Project, Fresno and Kings Counties, California                                       | Applied EarthWorks Inc.                                           |                                                                                        |
| KI-00094   | Submitter - Project Number 27101                                                                  | 2000 | Nelson, Wendy J.                                                            | Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project Segment WS04: Sacramento to Bakersfield                                                       | Far Western Anthropological Research Group, Inc.                  | 16-000084                                                                              |
| KI-00100   |                                                                                                   | 2000 | Pastron, Allen G. and Brown, Keith R.                                       | Historical and Cultural Resource Assessment Update Exising Telecommunications Facility Site No. CV-503-01 Glendale Ave Kings County, California                                         | Brown and Mills, Inc. Geotechnical and Environmental Consultants. |                                                                                        |
| KI-00109   | Submitter - Contract #675                                                                         | 2002 | Love, Bruce and Tang, Bai "Tom"                                             | Historic Property Survey Report: Cross Valley Rail Corridor Project Between the Cities of Visalia and Huron Tulare, Kings, and Fresno Counties, California                              | CRM TECH                                                          | 16-000067, 16-000068, 16-000086, 16-000122, 16-000123, 16-000124, 16-000127, 16-000128 |
| KI-00110   | Submitter - Contact #675                                                                          | 2002 | Love, Bruce and Tang, Bai "Tom"                                             | Archaeological Survey Report: Cross Valley Rail Corridor Project Between the Cities of Visalia and Huron Tulare, Kings, and Fresno Counties, California                                 | CRM TECH                                                          |                                                                                        |
| KI-00111   | Submitter - Contract #675                                                                         | 2002 | Love, Bruce and Tang, Bai "Tom"                                             | Historic Study Report/Historical Resources Evaluation Report: Cross Valley Rail Corridor Project Between the Cities of Visalia and Huron Tulare, Kings, and Fresno Counties, California | CRM TECH                                                          |                                                                                        |
| KI-00192   | Caltrans - 06-Kin-198, PM R16.9 (KP R27.2) EA 06-48750; Submitter - Contract No. 06A0852, Task 22 | 2007 | Lanner, David and Wohlgemuth, Eric                                          | Archaeological Survey Report for the 12th Avenue Interchange on State Route 198, Hanford, Kings County, California                                                                      | Far Western Anthropological Research Group, Inc.                  |                                                                                        |

## Report List

SSJVIC Record Search 20-168

| Report No. | Other IDs           | Year | Author(s)                                               | Title                                                                                                                                                                                                    | Affiliation                                      | Resources                                             |
|------------|---------------------|------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------|
| KI-00238   |                     | 2010 | Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey    | Volume I: A Geoarchaeological Overview and Assessment of Caltrans Districts 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA 06-0A7408 TEA Grant         | Far Western Anthropological Research Group, Inc. |                                                       |
| KI-00238A  |                     | 2010 | Meyer, Jack, Young, D. Craig, and Rosenthal, Jeffrey S. | Volume II: Appendices A Georchaological Overview and Assessment of Caltrans District 6 and 9 - Cultural Resources Inventory of Caltrans District 6/9 Rural Conventional Highways - EA06-0A7408 TEA Grant | Far Western Anthropological Research Group, Inc. |                                                       |
| KI-00268   |                     | 2011 | Greenwald, Alexandra                                    | Archaeological Survey Report for the California High Speed Train - Fresno to Bakersfield Section                                                                                                         | URS Corporation                                  |                                                       |
| KI-00269   |                     | 2015 | Schiffman, Robert A.                                    | Archaeological Evaluation of Areas Selected for Possible Nuclear Power Plants by the LADWP                                                                                                               | Bakersfield College                              |                                                       |
| KI-00310   | Other - PM 74000707 | 2017 | Jones, Jessica                                          | Cultural Resources Contstraints Report Kingsburg-Lemoore Recondutor, Kings County, California                                                                                                            | Applied EarthWorks, Inc.                         | 16-000122, 16-000128, 16-000129, 16-000246, 16-000447 |

## Historical Topographic Maps and Aerial Images Consulted

| Date | Name                                          | Author                                 | Reference                                                                                                                                                                                                                                                                                                                                                          | Notes                                                                                                                                                                        |
|------|-----------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1934 | State Division of Highways                    | C-3094_z-104                           | 1934 State Division of Highways. Flown by Fairchild Aerial Surveys. Aerial Survey No. C-3094_z-104, <a href="http://mil.library.ucsb.edu/ap_indexes/FrameFinder/">http://mil.library.ucsb.edu/ap_indexes/FrameFinder/</a> , accessed April 29, 2020.                                                                                                               | Historic residence is in the field in the project area. Southern Pacific Railroad visible. City is primarily agricultural/industrial.                                        |
| 1937 | Fresno County Aerial Survey 1937 13-ABJ 67-78 | Agricultural Adjustment Administration | 1937 Fresno County, California, Aerial Survey 1937 13-ABJ 67-78, <a href="http://cdmweb.lib.csufresno.edu/cdm/singleitem/collection/aerial/id/1178">http://cdmweb.lib.csufresno.edu/cdm/singleitem/collection/aerial/id/1178</a> , accessed through Map and Aerial Locator Tool (MALT), Henry Madden Library, California State University, Fresno, April 28, 2020. | Historic residence is in the field in the project area. Southern Pacific Railroad visible. City is primarily agricultural/industrial.                                        |
| 1942 | Fresno County Aerial Survey 1942 ABJ 8B-157   | Agricultural Adjustment Administration | 1937 Fresno County, California, Aerial Survey 1942 ABJ 8B-157, <a href="http://cdmweb.lib.csufresno.edu/cdm/singleitem/collection/aerial/id/1178">http://cdmweb.lib.csufresno.edu/cdm/singleitem/collection/aerial/id/1178</a> , accessed through Map and Aerial Locator Tool (MALT), Henry Madden Library, California State University, Fresno, April 28, 2020.   | Historic residence is still shown in the project area. Southern Pacific Railroad visible. City is primarily agricultural/industrial. No other updates to historic landscape. |
| 1926 | Hanford, CA 1:31,680                          | U.S. Geological Survey                 | 1926 Hanford, <i>Calif.</i> , 1:31,680 scale. U.S. National Geologic Map Database, Historical Topographic Map Collection (topo View), <a href="https://ngmdb.usgs.gov/topoview/">https://ngmdb.usgs.gov/topoview/</a> , accessed April 27, 2020.                                                                                                                   | The Peoples Ditch is shown on the westside of the project area. The project area is shown to have been used for agriculture.                                                 |
| 1954 | Hanford, CA 1:24:000                          | U.S. Geological Survey                 | 1954 Hanford, <i>Calif.</i> , 1:24,000 scale. U.S. National Geologic Map Database, Historical Topographic Map Collection (topoView), <a href="https://ngmdb.usgs.gov/topoview/">https://ngmdb.usgs.gov/topoview/</a> , accessed April 27, 2020.                                                                                                                    | The Peoples Ditch is shown on the westside of the project area. The project area is shown to have been used for agriculture. No buildings are shown in the project area.     |
| 1891 | Township 18 South, Range 21 East              | General Land Office                    | 1891 General Land Office Survey Plat, Township 18 South, Range 21 East, Mount Diablo, DM ID 380157. U.S. Department of the Interior, Bureau of Land Management General Land Office Records, <a href="https://glorerecords.blm.gov">https://glorerecords.blm.gov</a> , accessed April 27, 2020.                                                                     | No roads or other built environment shown.                                                                                                                                   |
| 1867 | Township 18 South, Range 21 East              | General Land Office                    | 1867 General Land Office Survey Plat, Township 18 South, Range 21 East, Mount Diablo, DM ID 380161. U.S. Department of the Interior, Bureau of Land Management General Land Office Records, <a href="https://glorerecords.blm.gov">https://glorerecords.blm.gov</a> , accessed April 27, 2020.                                                                     | No roads or other built environment shown.                                                                                                                                   |
| 1989 | Township 18 South, Range 21 East              | General Land Office                    | 1989 General Land Office Survey Plat, Township 18 South, Range 21 East, Mount Diablo, DM ID 380163. U.S. Department of the Interior, Bureau of Land Management General Land Office Records, <a href="https://glorerecords.blm.gov">https://glorerecords.blm.gov</a> , accessed April 27, 2020.                                                                     | No roads or other built environment shown.                                                                                                                                   |



## **APPENDIX C**

### **Native American Outreach**

\*Archaeological site location information is exempt from the Freedom of Information Act (FOIA) and California Public Records Act (CPRA).



# NATIVE AMERICAN HERITAGE COMMISSION

April 22, 2020

Diane Dyste

Applied EarthWorks, Inc.

Via Email to: DDyste@appliedearthworks.com

## Re: Hanford Place Medical and Mixed-Use Property Project, Kings County

Dear Ms. Dyste:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: [Nancy.Gonzalez-Lopez@nahc.ca.gov](mailto:Nancy.Gonzalez-Lopez@nahc.ca.gov).

Sincerely,



Nancy Gonzalez-Lopez  
Staff Services Analyst

Attachment



CHAIRPERSON  
**Laura Miranda**  
*Luiseño*

VICE CHAIRPERSON  
**Reginald Pagaling**  
*Chumash*

SECRETARY  
**Merri Lopez-Keifer**  
*Luiseño*

PARLIAMENTARIAN  
**Russell Attebery**  
*Karuk*

COMMISSIONER  
**Marshall McKay**  
*Wintun*

COMMISSIONER  
**William Mungary**  
*Paiute/White Mountain Apache*

COMMISSIONER  
[Vacant]

COMMISSIONER  
**Julie Tumamait-Stenslie**  
*Chumash*

COMMISSIONER  
[Vacant]

EXECUTIVE SECRETARY  
**Christina Snider**  
*Pomo*

**NAHC HEADQUARTERS**  
1550 Harbor Boulevard  
Suite 100  
West Sacramento,  
California 95691  
(916) 373-3710  
[nahc@nahc.ca.gov](mailto:nahc@nahc.ca.gov)  
[NAHC.ca.gov](http://NAHC.ca.gov)

**Native American Heritage Commission  
Native American Contacts List  
April 22, 2020**

Kings River Choinumni Farm Tribe  
Stan Alec  
3515 East Fedora Avenue  
Fresno CA 93726  
(559) 647-3227 Cell

Foothill Yokuts  
Choinumni

Wuksache Indian Tribe/Eshom Valley Band  
Kenneth Woodrow, Chairperson  
1179 Rock Haven Ct.  
Salinas CA 93906  
kwood8934@aol.com  
(831) 443-9702

Foothill Yokuts  
Mono  
Wuksache

Santa Rosa Rancheria Tachi Yokut Tribe  
Leo Sisco, Chairperson  
P.O. Box 8  
Lemoore CA 93245  
(559) 924-1278  
(559) 924-3583 Fax

Tache  
Tachi  
Yokut

Table Mountain Rancheria  
Leanne Walker-Grant, Chairperson  
P.O. Box 410  
Friant CA 93626  
rpennell@tmr.org  
(559) 822-2587  
(559) 822-2693 Fax

Yokuts

Table Mountain Rancheria  
Bob Pennell, Cultural Resources Director  
P.O. Box 410  
Friant CA 93626  
rpennell@tmr.org  
(559) 325-0351  
(559) 325-0394 Fax

Yokuts

Tule River Indian Tribe  
Neil Peyron, Chairperson  
P.O. Box 589  
Porterville CA 93258  
neil.peyron@tulerivertribe-nsn.gov  
(559) 781-4271  
(559) 781-4610 Fax

Yokuts

This list is current as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code, or Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans Tribes for the proposed:  
Hanford Place Medical and Mixed-Use Property Project, Kings County.



EXAMPLE

1391 W. Shaw Ave., Suite C  
Fresno, CA 93711-3600  
O: (559) 229-1856 | F: (559) 229-2019

August 4, 2020

Leo Sisco  
Chairperson  
Santa Rosa Rancheria Tachi Yokut Tribe  
P.O. Box 8  
Lemoore, CA 93245

RE: Hanford Place Medical and Mixed-Use Project in the City of Hanford, Kings County, California.

Dear Mr. Leo Sisco,

Applied EarthWorks, Inc. (Æ) is currently providing cultural resource services to Epic Management Group, Inc. for its Hanford Place Medical and Mixed-Use Project (Project) in the City of Hanford. The 45-acre development would include 15 structures that would cover medical outpatient clinic services, hospitality, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residences. The project would include a round-about over the top of the Peoples Ditch, and a 5-acre infiltration basin. The project is subject to the requirements of the California Environmental Quality Act.

The Project area is within Townships 18 south, Range 21 east, Section 35 of the Hanford, CA USGS quadrangle (see attached map). If you would like more detailed maps, please contact Æ and we would be more than happy to provide them. A search of the Native American Heritage Commission's (NAHC) Sacred Lands File was completed on April 22, 2020. The NA HC reported negative results in the Project area; however, the NAHC provided your contact information as someone who may have specific information about the Project area and vicinity.

A record search from the Southern San Joaquin Valley Information Center has been performed for the Project, and no previously recorded cultural resources were identified within the Project area. Resources identified within 0.5-mile of the Project area include Peoples Ditch (CA-KIN-97H) and the Southern Pacific Railroad (CA-KIN-00177H). Æ's archaeological and built environment pedestrian survey identified a historic-era refuse scatter and isolated historic-era glass fragment, as well as a previously unrecorded segment of the People's Ditch. No prehistoric archaeological sites, features, or isolated artifacts were observed.

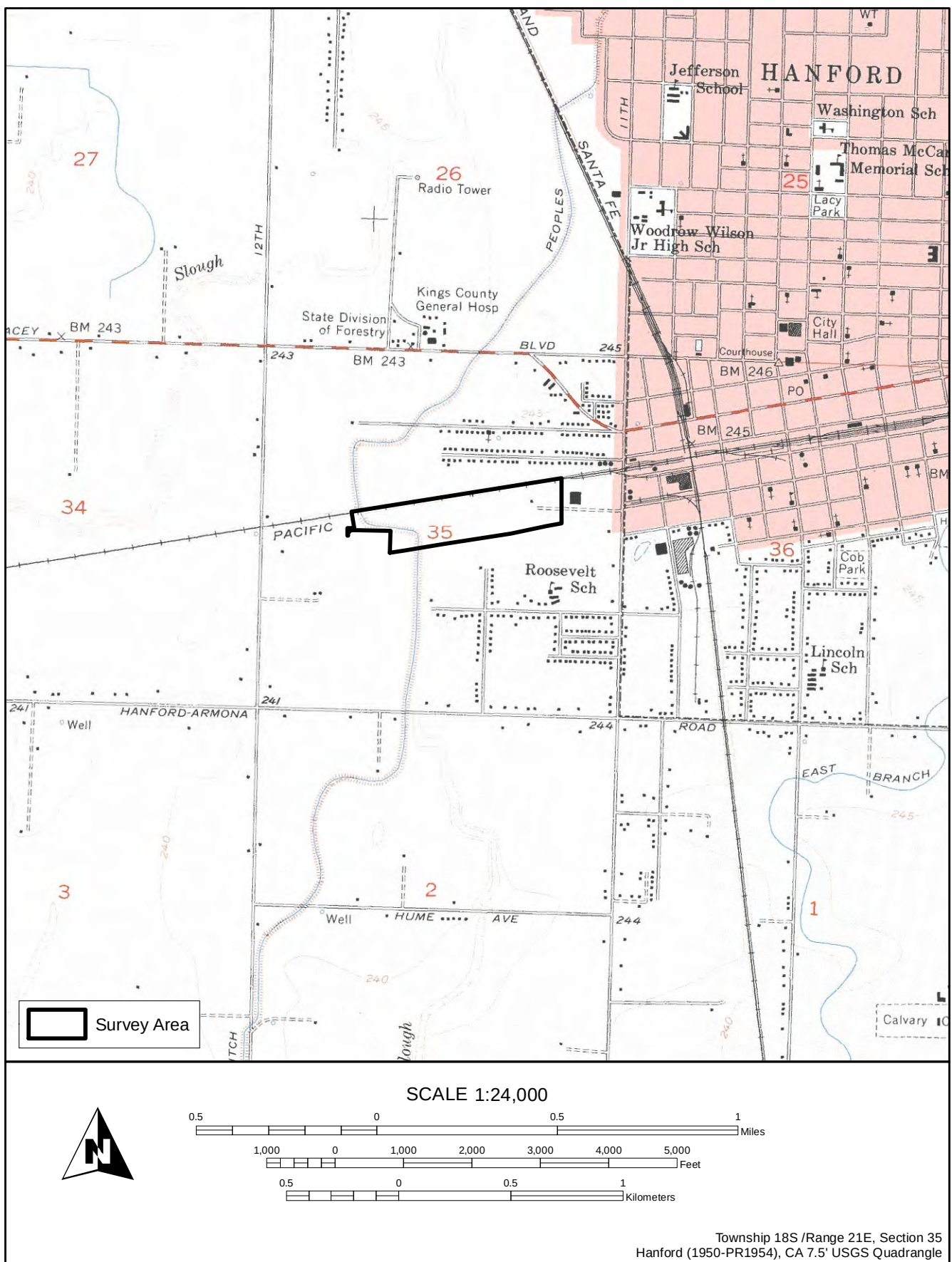
Your name and address were provided to us by the NAHC. If you have information on sacred or special sites in the area or if you have an interest in the Project, please call or send a letter to my attention using the address in the header. With your written permission, information shared with Æ about this Project will be included in the technical report documenting this investigation. Pursuant to state and federal laws protecting the confidentiality of archaeological sites and tribal cultural resources will be protected from release to the general public (Pub. Resources Code § 21082.3[c][1]; NHPA Section 304). I can be reached at the office desk at (559) 229-1856 X123, by cell at (559) 907-6028, or by email at [ddyste@appliedearthworks.com](mailto:ddyste@appliedearthworks.com).

Sincerely,

Diana Dyste,  
Senior Archaeologist

encl.: Project Map





NAHC location map for the Hanford Place Medical and Mixed-Use Property Project - AE4167.

## **APPENDIX D**

### **Cultural Resource Records**



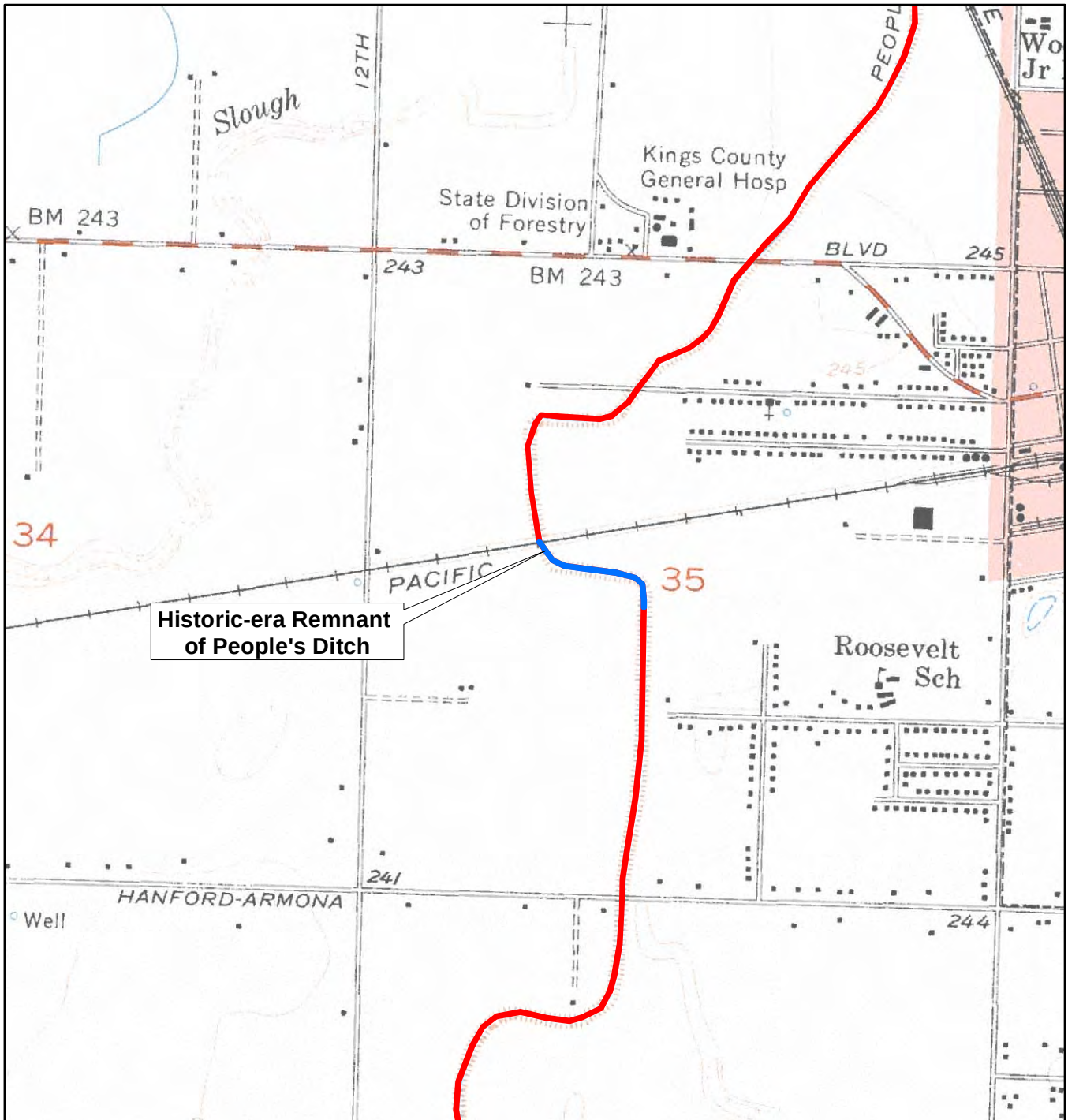
☐ Continuation ☒ Update

Page 1 of 4

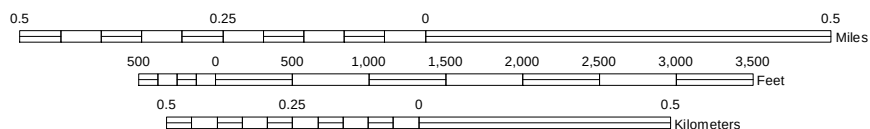
Resource Name or #: People's Ditch

- \*P2. Location: a. County: Kings ☐ Not for Publication ☒ Unrestricted  
b. USGS 7.5' Quad: Hanford, CA Date: 1950, photorev. 1954 T18S, R21E; SE ¼ of NW ¼ of Sec. 35 MD B.M.  
c. Address: N/A  
d. UTM:  
e. Other Locational Data: From the intersection of 11th Street and West Lacey Blvd. in Hanford, CA, drive west for 0.4 miles on West Lacey Blvd. Turn left (south) onto Campus Drive and proceed for 0.4 miles. At this point the road terminates and the modern segment of the People's Ditch continues south. The remnant of the historical alignment is west of the modern segment and north of State Route 198.
- \*P3a. Description: This update includes a 1,327-foot remnant segment of People's Ditch between the Burlington Northern Santa Fe Railway tracks in the north and State Route 198 in the south. According to Google Earth imagery, this segment was abandoned sometime between 1994 and 2003, along with a segment north of the railroad west of Campus Drive. At that time, People's Ditch was realigned and piped under Campus Drive and the railroad tracks for a distance of approximately 1,660 feet. It resurfaces just south of the railroad tracks and continues to flow south in a J-shaped configuration between the railroad and State Route 198 east of its original alignment before crossing under the highway and continuing south parallel to its historical alignment. This new segment is less 50 years old. The ditch's remnant historical segment has been all but erased from the landscape in this area. Remains of a concrete containment well are visible at the northern end of the remnant segment.
- \*P3b. Resource Attributes: HP11. Engineering Structure
- \*P7. Owner and Address: Peoples Ditch Company, 870 Greenfield Ave, Hanford, CA 93230
- \*P8. Recorded By: Carlos van Onna, Applied EarthWorks, Inc., 1391 W. Shaw Ave., Suite C, Fresno, CA 93711
- \*P9. Date Recorded: 5/23/2020
- \*P10. Survey Type: ☒ Intensive ☐ Reconnaissance ☐ Other Describe:
- \*P11. Report Citation: Dyste, Diana T., Jessica Jones, Dennis McDougall, Ward Stanley, and Carlos van Onna 2020 *Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project in the City of Hanford, Kings County, California*. Applied EarthWorks, Inc., Fresno, California. Prepared for The Hanford Group, c/o Epic Management Group, Inc., Temecula, California.

\*Attachments: ☐ NONE ☒ Location Map ☒ Sketch Map ☐ Continuation Sheet  
☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record  
☐ Photograph Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record  
☒ Other (list): Location Map showing route entire ditch



SCALE 1:15,000

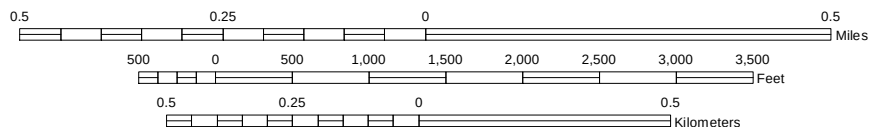


TRUE NORTH



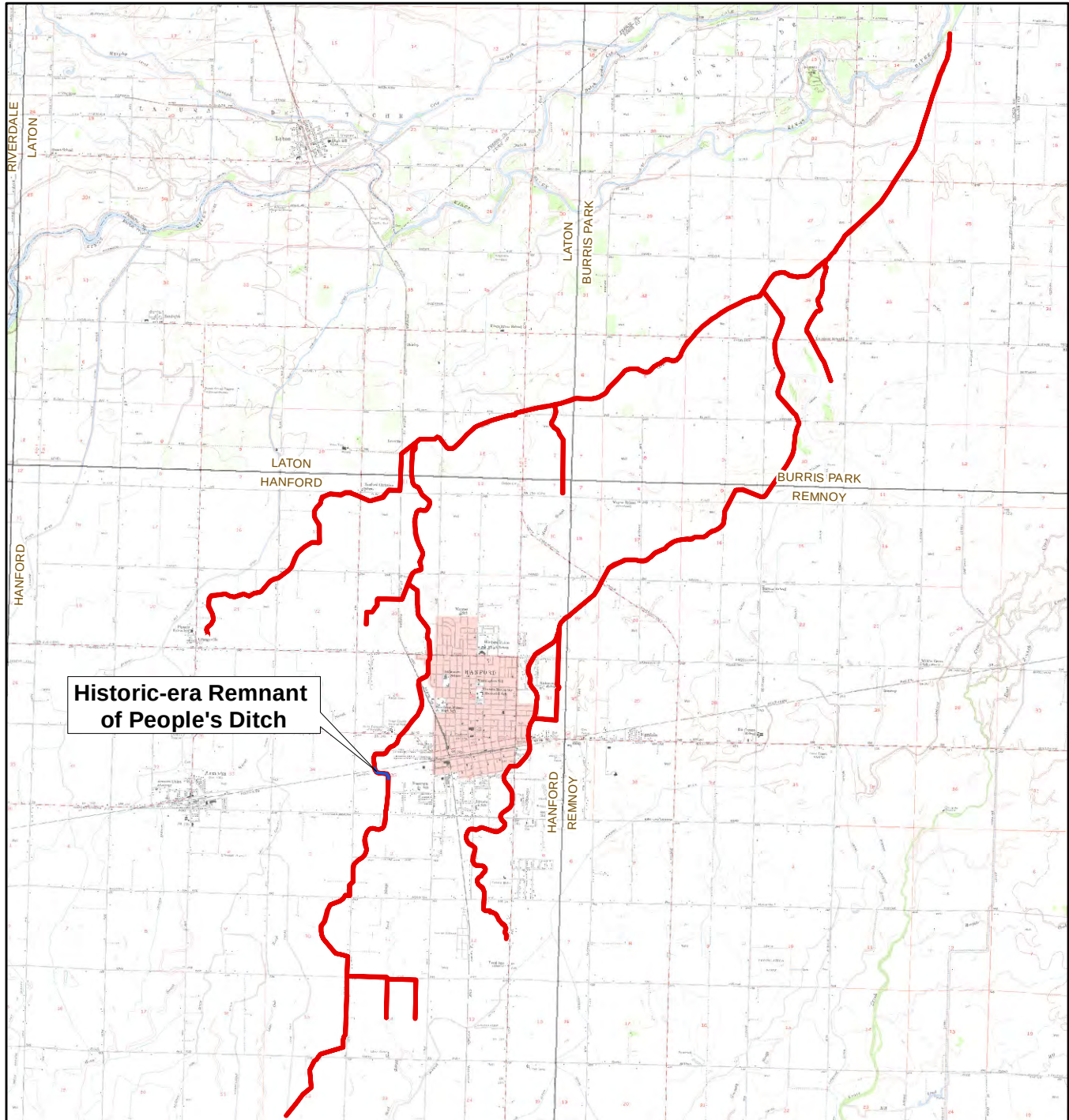


SCALE 1:15,000

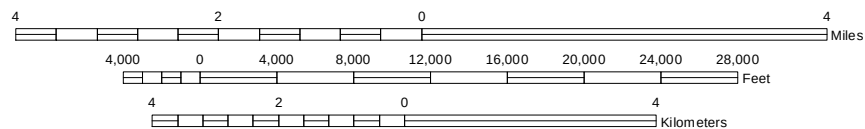


TRUE NORTH





SCALE 1:120,000



TRUE NORTH

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary #  
HRI #  
Trinomial  
NRHP Status Code

Other Listings  
Review Code

Reviewer

Date

Page 1 of 2

Resource Name or # AE-4167-01

**P1. Other Identifier:**

**\*P2. Location: a. County:** Kings County

☒ Not for Publication ☐ Unrestricted

**b. USGS 7.5' Quad:** Hanford, CA **Date:** 1950, photorev.1954 T 18S, R 21E; SW ¼ of NE ¼ of Sec. 35 MD B.M.

**c. Address:** n/a

**d. UTM:** NAD 83, Zone 11; 261204 mE / 4022976 mN

**e. Other Locational Data:** From the intersection of 11th Street and West Lacey Blvd. in Hanford, drive west for 0.4 miles on West Lacey Blvd. Turn left (south) on Campus Drive and proceed for 0.4 miles. At this point the road terminates. The site is at 88° at 357 meters (northwest corner of site) in a vacant lot north of State Route 198.

**\*P3a. Description:** The site is a broad historical refuse scatter extending across 6 acres. It consists of domestic refuse, including, but not limited to, window glass of various colors, broken bottles, ceramic fragments, insulators, wood fragments, bricks, river cobbles with cement mortar attached, heavy metal pipe fragments, miscellaneous metal fragments, a toy marble, and a bottle base fragment showing possible pressure flaking along one edge. The scatter is most dense within the northwest corner of the site. A diffuse scatter of isolated artifacts extends beyond this concentration to the south and east site boundaries. A slight topographic rise is present along the entire northern boundary, which is elevated 2 feet high and then levels off. A total of 12 diagnostic artifacts were observed and recorded. Although not formally dated, the artifacts appear to be from the first half of the twentieth century. A 1937 aerial photograph depicts a residence in the site location (Fresno County, California, Aerial Survey 1937 13-ABJ 67-78, <http://cdmweb.lib.csufresno.edu/cdm/singleitem/collection/aerial/id/1178>).

**\*P3b. Resource Attributes:** AH.4

**\*P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

**\*P5a. Photograph or Drawing:**



**P5b. Description of Photo:** View of site from the northeast corner, looking west.

**\*P6. Date Constructed/Age and Sources:**  
☐ Prehistoric ☒ Historic ☐ Both

**\*P7. Owner and Address:**  
The Hanford Group  
c/o Epic Management Group,  
Inc. 44045 Margarita Road,  
Suite #100 Temecula, CA 92592

**\*P8. Recorded By:** Ward Stanley  
Applied EarthWorks, Inc.  
1391 W. Shaw Ave., Suite C  
Fresno, CA 93711

**\*P9. Date Recorded:** 5/23/2020

**\*P10. Survey Type:** ☒ Intensive  
☐ Reconnaissance ☐ Other

**Describe:** Pedestrian survey at 15-meter interval transects.

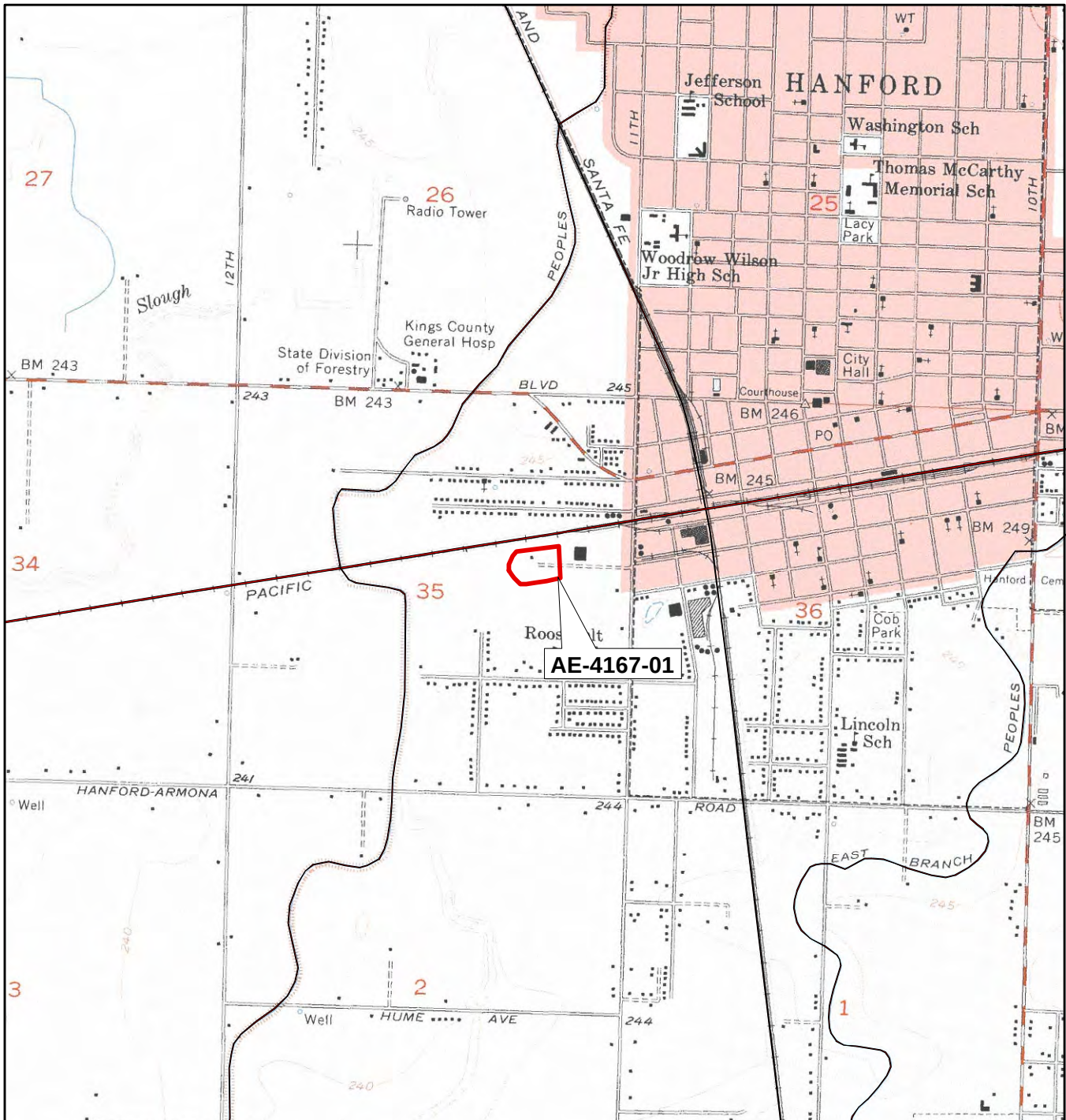
**\*P11. Report Citation:** Dyste, Diana T., Jessica Jones, Dennis McDougall, Ward Stanley, and Carlos van Onna  
2020 *Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project in the City of Hanford, Kings County, California*. Applied EarthWorks, Inc., Fresno, California. Prepared for The Hanford Group, c/o Epic Management Group, Inc., Temecula, California.

**\*Attachments:** ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet  
☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record  
☐ Photograph Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record  
☐ Other (list):

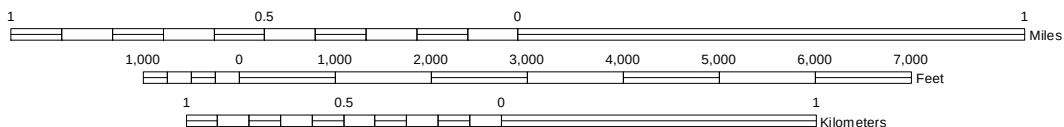
DPR 523A (1/95)

**\*Required Information**





SCALE 1:24,000



TRUE NORTH

State of California — The Resources Agency  
DEPARTMENT OF PARKS AND RECREATION  
**PRIMARY RECORD**

Primary #

HRI #

Trinomial

NRHP Status Code

Other Listings  
Review Code

Reviewer

Date

Page 1 of 2

Resource Name or # AE-4167-ISO-01

**P1. Other Identifier:**

**\*P2. Location:** a. County: Kings County

☒ Not for Publication ☐ Unrestricted

b. USGS 7.5' Quad: Hanford, CA Date: 1950, photorev. 1954 T 18S, R 21E; SW ¼ of NE ¼ of Sec. 35 MD B.M.

c. Address: N/A

d. UTM: NAD 83, Zone 11; 2610931 mE / 4022861 mN

e. **Other Locational Data:** From the intersection of 11th Street and West Lacey Blvd. in Hanford, drive west for 0.4 miles on West Lacey Blvd. Turn left (south) on Campus Drive and proceed for 0.4 miles. At this point the road terminates and the isolated find was located 141° at 146 meters from this point.

**\*P3a. Description:** The isolated artifact is an aqua blue glass insulator fragment. The insulator was found on the ground surface east of the Peoples Canal. The artifact was collected.

**\*P3b. Resource Attributes:**

**\*P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☒ Other: Isolate

**\*P5a. Photograph or Drawing:**



**P5b. Description of Photo:** Fragmented aqua blue glass insulator.

**\*P6. Date Constructed/Age and Sources:**  
☐ Prehistoric ☒ Historic ☐ Both

**\*P7. Owner and Address:**  
The Hanford Group  
c/o Epic Management Group, Inc.  
44045 Margarita Road, Suite #100  
Temecula, CA 92592

**\*P8. Recorded By:** Ward Stanley  
Applied EarthWorks, Inc.  
1391 W. Shaw Ave., Suite C  
Fresno, CA 93711

**\*P9. Date Recorded:** 5/23/2020

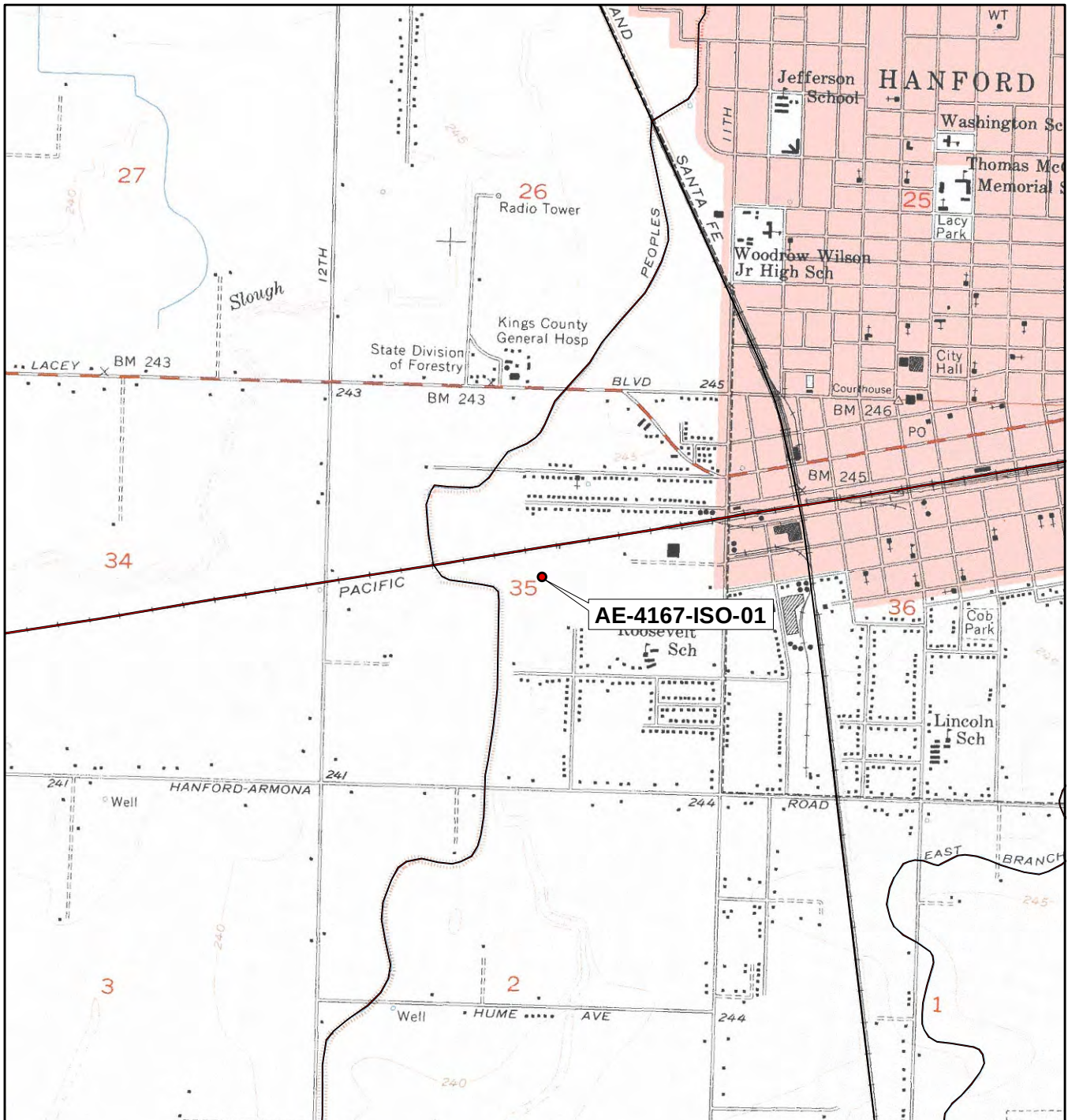
**\*P10. Survey Type:** ☒ Intensive  
☐ Reconnaissance ☐ Other

**Describe:** Pedestrian survey at 15-meter interval transects.

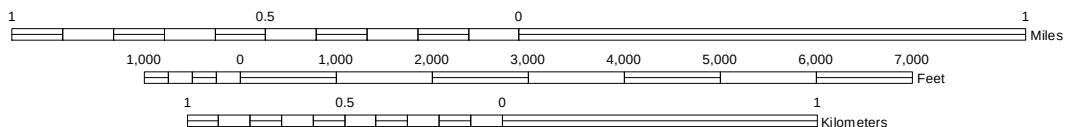
**\*P11. Report Citation:** Dyste, Diana T., Jessica Jones, Dennis McDougall, Ward Stanley, and Carlos van Onna  
2020 *Cultural Resource Inventory for the Hanford Place Medical and Mixed-Use Property Project in the City of Hanford, Kings County, California*. Applied EarthWorks, Inc., Fresno, California. Prepared for The Hanford Group, c/o Epic Management Group, Inc., Temecula, California.

**\*Attachments:** ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet  
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☐ Photograph Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record  
☐ Other (list):





SCALE 1:24,000



TRUE NORTH

## **APPENDIX D**

# **PRELIMINARY GEOTECHNICAL INVESTIGATION AND GEOLOGIC AND SEISMIC HAZARDS EVALUATION REPORT**

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June 9, 2020  
Kleinfelder Project No.: 20210045.001A

**Mr. Burley Wright**  
**Vice President, Development**  
**Epic Management Group, Inc.**  
44045 Margarita Rd., Suite 100  
Temecula, California 92592  
Direct: (951) 746-0012  
Office: (951) 331-3583

**Subject: Preliminary Geotechnical Investigation and  
Geologic and Seismic Hazards Evaluation Report  
Propose Hanford Place, Medical and Mixed-Use Property  
Hanford, California**

Dear Mr. Wright,

The attached report presents the results of Preliminary Geotechnical Investigation and Geologic and Seismic Hazards Evaluation performed for the proposed Hanford Place, Medical and Mixed-Use Property to be located in Hanford, California. The report describes the study, findings, conclusions and recommendations for use in project design.

The primary concern for development of the site is presence of compressible soils residing in the upper approximately 10 feet of native soils across the project site. These soils are subject to hydrocompaction, which is a common soil condition in the Hanford area. Hydrocompactive soil has a loose skeletal structure, which is weakly cemented by soluble salts and/or minor amounts of clay. Increases in soil moisture reduce the interparticle cementation (dry strength) of the soil resulting in a decrease in the volume of the soil structure. This condition can lead to post construction settlement of structures if soils subsequently become wetted. At the present moisture content, the on-site natural soil has sufficient strength to support the proposed preliminary improvements. However, should the soil be subject to post-construction moisture increases, moderate soil compression will likely occur below structures and related site improvements.

The effects of hydrocompactive soil can be mitigated through earthwork excavation and recompaction of the soils. Disposal of the soils is not necessary. From a development perspective, the efforts associated with the additional earthwork to mitigate the hydrocompactive soils will increase site development costs.

Kleinfelder considered an alternative option to mitigate against the settlement of the structures due to hydrocompaction, which involved the use of deep foundation systems (such as drilled pier foundations, auger cast piles, underpinning piers, etc.). However, supporting building structures on deepened foundation systems does not mitigate the occurrence of liquefaction and therefore, would invariably require the use of grade beams and structural slabs in addition to deepened foundations. The deepened foundations, grade beams, and structural would likely be cost

prohibitive as compared to conventional grading techniques and therefore was excluded deep foundations as an option.

Kleinfelder appreciates the opportunity to provide geotechnical engineering and geologic services to Epic Management Group, Inc. during the design phase of this project. If there are any questions concerning the information presented in this report, please contact this office at your convenience.

Respectfully submitted,

**KLEINFELDER, INC.**



Adam AhTye, PE  
Project Engineer



James A. Wetenkamp, CEG #2556  
Project Engineering Geologist



Stephen P. Plauson, PE, GE  
Principle Geotechnical Engineer





**PRELIMINARY GEOTECHNICAL INVESTIGATION  
AND GEOLOGIC AND SEISMIC HAZARDS  
EVALUATION REPORT  
PROPOSED HANFORD PLACE, MEDICAL AND  
MIXED-USE PROPERTY  
HANFORD, CALIFORNIA  
KLEINFELDER PROJECT NO. 20190494.001A**

**JUNE 9, 2020**

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PROJECT FOR WHICH THIS REPORT WAS PREPARED.

Prepared For:

Epic Management Group, Inc.  
44045 Margarita Rd., Suite 100  
Temecula, California 92592

**PRELIMINARY GEOTECHNICAL INVESTIGATION AND  
GEOLOGIC AND SEISMIC HAZARDS EVALUATION REPORT  
PROPOSED HANFORD PLACE, MEDICAL AND MIXED-USE PROPERTY  
HANFORD, CALIFORNIA**

Prepared by:



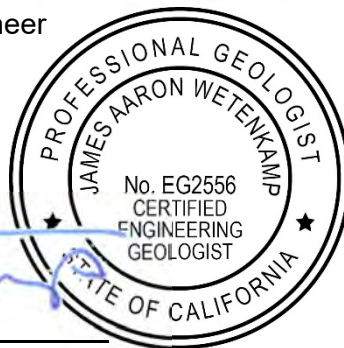
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Project Engineer



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June 9, 2020  
Kleinfelder Project No.: 20190494.001A

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- 2 Exploration Location Map
- 3 Site Plan and Geology Map
- 4 Area Geology Map
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- 6 Cross Section A-A'
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- 9 Fema Flood Map
- 10 Dam Inundation Map

## **APPENDICES**

- A Boring Logs
- B Laboratory Results
- C Liquefaction Analysis



## 1 INTRODUCTION

---

### 1.1 GENERAL

This report presents the results of a preliminary geotechnical investigation and geologic and seismic hazards evaluation for the proposed Hanford Place medical and mixed-use property to be located in Hanford, California. The purpose of the investigation was to explore and evaluate the subsurface conditions at the site, identify and assess potential geologic hazards, and develop preliminary geotechnical engineering recommendations to aid in project design. The Site Vicinity Map, presented on Figure 1, shows the location of the project and the Exploration Location Map, presented on Figure 2, shows the approximate boring locations.

This report includes preliminary recommendations related to the geotechnical and geologic aspects of project design. Conclusions and recommendations presented in this report are based on subsurface conditions encountered at the boring locations, as well as the provisions and requirements outlined in the “Additional Services” and “Limitations” Sections of this report. Recommendations presented herein should not be extrapolated to other areas or used for other projects without prior review.

### 1.2 PROPOSED CONSTRUCTION

An understanding of the project is based on an email correspondence with representatives of the developer’s design team, Zumwalt-Hansen and Associates (Zumwalt) and Epic Management Group, and a conceptual site plan of the proposed building locations. It is understood that approximately 43 acres of undeveloped land are part of a preliminary plan for development of a medical and mixed-use facilities project.

The development is anticipated to include multi-story (up to 4-story) care and treatment facilities, multifamily residential, a hospitality/conference center, 1 to 2 story medical offices and retail buildings, and a storm water infiltration basin. The structures are anticipated to consist of wood, steel, or concrete structures supported on shallow spread foundations and concrete slab-on-grade floors. For the preliminary study, maximum wall and column loads are assumed to be less than 5 kips per foot and 200 kips, respectively.

Appurtenant improvements are anticipated to include off-site asphalt concrete pavements, on-site asphalt and Portland cement concrete pavements, underground utilities, sound walls, hardscape, and landscaping. It is assumed that other improvements may include covered parking and storm water basins. Grading plans were not available at the time of this proposal. However, cuts and fills of up to 3 feet in vertical extent are anticipated to create parking/pad grades and positive site drainage. The infiltration basin is anticipated to be a depth of approx. 15 feet.

The project scope also includes relocating the existing open-cut Peoples Ditch to an underground reinforced concrete pipe. The existing ditch is approx. 3.5 feet deep, measured from the original ground, with approx. 2.5-foot tall embankments. The proposed pipe is anticipated to be a diameter of 5.5 feet and maintain the existing alignment.

### 1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of the geotechnical investigation was to explore the site subsurface conditions and develop recommendations and professional opinions to assist in project design. The scope of our services was outlined in Kleinfelder's proposal dated May 21, 2019 and included the following:

- A description of the proposed project, including a vicinity map showing the location of the site, a site plan showing the locations of the exploration points for this study, and a geologic cross-section
- A description of the site surface and subsurface conditions encountered during the field investigation, including boring logs
- A summary of the field exploration and laboratory testing program
- Comments on depth to groundwater and potential impact on design and construction
- Recommendations for site preparation and earthwork grading, including a discussion concerning the use of on-site soils for engineered fill
- Recommendations for conventional foundation design, including available bearing capacity of foundation soil for sustained and total combined loading and estimated settlement
- Recommendations for frictional coefficient and passive pressure for resistance of lateral loads

- Recommendations to aid in design of concrete slabs-on-grade, including modulus of subgrade reaction
- Recommendations for earth retaining structures
- Recommendations to aid in design of pier/pole foundations for miscellaneous sign, light, and canopy structures
- Recommendations for asphalt and Portland cement concrete pavement sections paced on a range of truck traffic indexes
- Discussion of the general corrosion characteristics of the site soils, and
- Comments to aid in the design of site drainage.

The purpose of the geologic and seismic hazards assessment is to identify and assess potential geologic and seismic hazards at the site. We understand that the facility does not fall under the jurisdiction of the California Office of Statewide Health Planning and Development (OSHPD); however, to meet the standard of care for medical facilities this report has been prepared in accordance with the requirements for such studies set forth by the Essential Services Buildings Seismic Safety Act of 1986 and defined in the California Code of Regulations, Title 24, 2019 California Building Code (CBC) using guidelines outlined by the California Geological Survey (CGS). In addition to these documents, this report is prepared in accordance with the guidelines established in the following documents:

- CGS Note 48 (Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings),
- CGS Note 44 (Recommended Guidelines for Preparing Engineering Geologic Reports),
- CGS Note 42 (Guidelines to Geologic/Seismic Reports),
- CGS Special Publication 42 (Fault Rupture Hazard Zones in California),
- CGS Note 41 (Guidelines for Reviewing Geologic Reports), and
- CGS Special Publication 117A (Guidelines for Evaluating and Mitigating Seismic Hazards in California).

The geologic and seismic hazards evaluation includes the following items:

- Research and review of pertinent geologic, geotechnical, and seismologic publications and maps covering the site and vicinity in Kleinfelder's library;
- Evaluation of geologic conditions including the results of the boring and laboratory testing of soil samples completed during the geotechnical investigation;
- Estimate of Site Class per Table 1613A.5.2 of 2019 CBC;
- Provide seismic design parameters per Chapter 1613A of 2019 CBC;
- Conclusions regarding fault rupture, ground accelerations, and ground failure potential;
- Conclusions regarding the potential for liquefaction, seismic settlement and compaction, flooding, tsunamis, seiches, seismically induced landsliding, lurching and lateral spreading; and
- Preparation of this written report for the site with conclusions and recommendations as required regarding geologic and seismic hazards.

The references reviewed for compilation of this report are listed in the "References" section of this report. Observations and conclusions presented herein specifically exclude the assessment of environmental characteristics, particularly those involving hazardous substances.

## 2 FIELD EXPLORATION AND LABORATORY TESTING

---

### 2.1 FIELD EXPLORATION

The field exploration, conducted on April 20 and 21, 2020 consisted of drilling nine (9) exploratory test borings. The test borings were drilled with a CME-75 truck-mounted drill rig utilizing hollow stem auger techniques. The borings were advanced to depths ranging from approximately 16.5 to 51.5 feet below the existing ground surface (bgs). Additionally, seven (7) bulk samples of the near surface soils in areas of proposed pavements were collected for R-value testing. The approximate locations of the test borings and R-values are indicated on the Exploration Location Map, Figure 2.

The soils encountered in the borings were visually classified in the field and a continuous log was recorded. Relatively undisturbed samples were collected from the test borings at selected depths by driving a 2.5-inch I.D. split barrel sampler containing brass liners into the undisturbed soil with a 140-pound automatic hammer free falling a distance of 30 inches and having an energy efficiency rating of 89 percent. In addition, samples of the subsurface material were obtained using a 1.5-inch I.D. standard penetrometer, driven 18 inches in accordance with American Society for Testing and Materials (ASTM) D1586 test procedures. The sampler was used without liners. Resistance to sampler penetration was noted on the boring logs as the number of blows per foot over the last 12 inches of sampler penetration. The blow counts listed in the boring logs have not been corrected for the effects of overburden pressure, rod length, sampler size, or hammer efficiency. Bulk samples were also obtained from auger cuttings at one boring location.

### 2.2 FIELD AND LABORATORY TESTING

Penetration rates, determined in general accordance with ASTM D1586, were used to aid in evaluating the consistency, relative density, compression and strength characteristics of the foundation soils. Extensive experience in the central and southern San Joaquin Valley has shown correlations and design methodologies utilizing the standard penetration test (SPT) data best defines performance in the local unsaturated soil.

Laboratory tests were performed on selected samples to evaluate certain physical characteristics. The following laboratory tests were used to develop the design geotechnical parameters:



- Unit weight (ASTM D2937)
- Moisture content (ASTM D2216)
- Amount of Material in Soils Finer Than the No. 200 Sieve (ASTM D1140)
- Atterberg Limits (ASTM D4318)
- Collapse Potential (ASTM D5333)
- Direct Shear (ASTM 3080)
- Modified Proctor (ASTM D1557)
- Soluble Sulfate Content (California Test Method No. 417)
- Soluble Chloride Content (California Test Method No. 422)
- pH and Minimum Resistivity (California Test Method No. 532)
- R-Value (ASTM D2844)

The dry density and moisture content test results are shown on the boring logs in Appendix A. The soluble sulfate, soluble chloride, pH and minimum resistivity are discussed in the “Corrosion Potential” section (Section 6.7). The remaining test results are provided in Appendix B.

### 3 SITE CONDITIONS

---

#### 3.1 SURFACE CONDITIONS

The project site consists of approximately 43 acres of undeveloped land located between 11<sup>th</sup> and 12<sup>th</sup> Avenues, and Highway 198 and Union Pacific railroad tracks. The western approx. third and eastern approx. two thirds of the site are currently divided by Peoples Ditch, an open-cut canal traversing the site. It is understood that the People's Ditch is anticipated to be converted to an underground reinforced concrete pipe within the project limits. Based on Google Earth imagery, it appears Peoples Ditch traversed the site along the western boundary of the project site. This alignment was abandoned circa early- to mid-2000s, coincident with the construction of the Adventist Health Medical Center located north, north-west of the project site.

At the time of field reconnaissance, the project site supported a moderate growth of annual grasses and weeds. The project site appeared to be relatively flat and at the same relative elevation of the nearby roads. It is understood the project site is periodically plowed for fire hazard mitigation.

At the time of the investigation, loose sediments within Peoples Ditch was probed to a depth of approximately 2 to 2.5 feet below the ditch bottom.

#### 3.2 EARTH MATERIALS

The following description provides a general summary of the subsurface conditions encountered during the field exploration and as further evaluated through the laboratory testing program. For a more thorough description of the actual conditions encountered at specific boring locations, refer to the boring logs presented in Appendix A. The soils were classified according to the Unified Soil Classification System (ASTM D2487).

The subsurface soils consist Holocene aged Great Valley fan deposits. The general soil profile encountered by the subsurface exploration consisted primarily of silty sand and sandy silt to depth of approximately 10 to 15 feet bgs underlain by laterally discontinuous layers of silty clay, sandy silt, silty sand, and poorly graded sand. The granular soils had a relative consistency of medium dense to very dense and the fine-grained soils had a relative consistency of stiff to very stiff.

Geologic cross sections, interpreted from the test borings, are presented on Figure 6. The site geology and locations of the cross sections are presented on Figure 3.

### 3.3 GROUNDWATER CONDITIONS

Groundwater was not encountered in the explorations. However, perched water was encountered within boring B-7 at a depth of approximately 45 feet bgs at the time of investigation. It is anticipated that the observed groundwater at the time of drilling was a perched on a dense layer of silty clay. Research utilizing the California Department of Water Resources (DWR) Water Data Library website indicate groundwater levels to be greater than 50 feet bgs in 2011 (Well No. 18S21E34B002M) located approximately ½ mile northwest of the site. Additional research utilizing the DWR website indicated that the historic high groundwater depth was recorded at 15 feet in the late 1960's. However, a steady decline in the depth to groundwater can be observed to current depths shown on the DWR website.

It is possible that groundwater conditions at the site could change at some time in the future due to variations in rainfall, groundwater withdrawal, regional agricultural production, construction activities, groundwater recharge practices, or other factors not apparent at the time our test borings were performed. However, groundwater is not anticipated to impact design or construction. Considering the elevated groundwater levels in the early 1970's due to reservoir management practices (15 feet) and elevated groundwater levels in the mid-1980's due to precipitation (51 feet), it is suggested that the high groundwater level of 15 feet will not realistically occur in the future. It is understood that recharge programs such as Sustainable Groundwater Management Act (SGMA) may increase the current groundwater levels. However, it is anticipated the City will limit the amount of recharge and subsequent rise in groundwater due to potential damage to underground infrastructure. Therefore, Kleinfelder recommends a design high groundwater depth to be 25 feet bgs.

## 4 GEOLOGIC AND SEISMIC CONDITIONS

---

### 4.1 REGIONAL GEOLOGY

The proposed facility lies in the southern portion of the Great Valley geomorphic province near its boundary with the Sierra Nevada geomorphic province in Central California. The filling of a large structural trough or downwarp in the underlying bedrock formed the Great Valley province of California. The trough is situated between the Sierra Nevada Range on the east and the Coast Range on the west. Both of these mountain ranges were initially formed by uplifts, which occurred during the Jurassic and Cretaceous periods (greater than 65 million years ago). Renewed uplift began in the Sierra Nevada during late Tertiary time and is continuing today. The trough, which underlies the Valley, is asymmetrical with the greatest depth of sediments near the western margin. The sediments, which fill the trough, originated as erosional material from the adjacent mountains and foothills. The upper and youngest sediments in the basin are continental deposits consisting of alluvial fan deposits and flood-basin, lake, and marsh deposits. Figure 5 provides a detailed regional geologic map of the area by the California Geologic Survey (CGS) (Geologic Map of California, v. 2.0, 2010).

### 4.2 AREA AND SITE GEOLOGY

The majority of the native sediments in the project area have been mapped (Fresno geologic sheet) by CGS (Geologic Map of California, Fresno Sheet, Matthews and Burnett 1965). The site is located within the Holocene age Recent Alluvial Fan Deposits in the Great Valley (map symbol Qf). The soil subgrade characteristics encountered during the field investigation (i.e. soil type, blow count, etc.) appear to be consistent with this mapped unit. Figure 4 presents a site-specific geologic map of the project. The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) has mapped the soils on the entire project site as Nord Complex (149). Based on the map unit description of the NRCS, soils designated with map units of 149 consist of alluvial deposits derived from igneous rock sources which corresponds to Unified Soil Classification group symbol of SM (Silty Sand) and ML (Sandy Silt).

#### 4.3 FAULTS LOCAL TO THE PROPOSED SITE

Based on the information provided in the California Geological Survey Special Publication 42 (CGS, 2018), the site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone, where site-specific studies addressing the potential for surface fault rupture are required. No known active faults traverse the site. The project site is situated within a region traditionally characterized by few active faults and a low to moderate potential for seismic activity.

An active fault is a fault that has experienced seismic activity during historic time (since roughly 1800) or exhibits evidence of surface displacement during Holocene time (CGS, 2018). The terms “sufficiently active” and “well-defined” are used by the CGS as criteria for zoning faults under the Alquist-Priolo Earthquake Fault Act. A “sufficiently active fault” is a fault that shows evidence of Holocene surface displacement along one or more of its segments and branches, while a “well-defined fault” is a fault whose trace is clearly detectable by a trained geologist as a physical feature at or just below the ground surface. The definition “inactive” generally implies that a fault has not been active since the beginning of the Pleistocene Epoch (older than 2.6 million years).

Locations of the significant active and well-defined faults are shown on Figure 7. The site is located approximately 94 km east from the San Andreas fault and 42 km east of the Great Valley fault. A major seismic event on these fault segments may cause significant ground shaking at the site.

#### 4.4 SIGNIFICANT FAULTS

The faults within 100 km of the site, and their seismic parameters are listed in Table 4.4-1. For faults with multiple segmentation scenarios, Kleinfelder has only listed parameters for the scenario rupturing the most segments (i.e., the most severe scenario). The locations of the faults, presented on Figure 7, and associated parameters, presented on Table 4.4-1, are based on the USGS 2008 National Seismic Hazard Maps (Petersen et al., 2008). The maximum earthquake magnitudes presented in this table are based on the moment magnitude scale developed by Kanamori (1977).



**Table 4.4-1**  
**Significant Faults**

| Fault Name      | Fault Length (km) | Closest Distance <sup>1</sup> (km) | Maximum Earthquake Magnitude <sup>2</sup> | Slip Rate (mm/yr) |
|-----------------|-------------------|------------------------------------|-------------------------------------------|-------------------|
| Great Valley 14 | 24                | 42                                 | 7.2                                       | 1.5               |
| Great Valley 13 | 32                | 45                                 | 7.1                                       | 1.5               |
| Great Valley 12 | 17                | 62                                 | 6.4                                       | 1.5               |
| Great Valley 11 | 24                | 73                                 | 6.6                                       | 1.5               |
| San Andreas     | 245               | 85                                 | 8.0                                       | 34                |
| San Juan        | 68                | 91                                 | 7.1                                       | 1.5               |
| Great Valley 10 | 22                | 95                                 | 6.5                                       | 1.5               |

<sup>1</sup>Closest distance to the potential rupture.

<sup>2</sup>*Moment magnitude*: An estimate of an earthquake's magnitude based on the seismic moment (measure of an earthquake's size utilizing rock rigidity, amount of slip, and area of rupture).

Table 4.4-1 represents the scenarios of rupturing all the segments for these faults. Other rupture scenarios can be found in Field et al. (2008).

#### 4.5 HISTORICAL SEISMICITY

The project site and vicinity are located in an area characterized by historically low seismicity. A number of earthquakes have occurred within a 100 km radius of the site during historic time (since 1800). Some of the significant regional earthquake events include the 1857 (M7.9) Fort Tejon earthquake, located approximately 90 km to the southwest of the site; the 1983 (M6.7) Coalinga earthquake, located about 59 km to the southwest; and the 1922 (M6.5) Parkfield earthquake, located about 83 km to the southwest.

Epicenters of some significant earthquakes ( $M \geq 4.0$ ) within the vicinity of the site are shown on Figure 7. The earthquake database used in the search contains in excess of 5,500 seismic events and covers the period from 1800 through May 2020. The earthquake database is primarily comprised of an earthquake catalog for the State of California prepared by the CGS (formerly Division of Mines and Geology, DMG). The catalog contains earthquake records from January 1, 1900 through December 31, 1974. Updates prepared by the CGS in 1979 and 1982 extend the coverage through 1982. In addition to the CGS updates, the data for earthquakes that occurred during the period between 1910 through May 2020 has been obtained from a composite catalog

by the Advanced National Seismic System (ANSS). The ANSS catalog is a worldwide earthquake catalog which is created by merging the master earthquake catalogs from contributing ANSS member networks and then removing duplicate events, or non-unique solutions from the same event. The ANSS network includes the Northern and Southern California Seismic Networks, the Pacific Northwest Seismic Network, the University of Nevada, Reno Seismic Network, the University of Utah Seismographic Stations, and the United States National Earthquake Information Service. The earthquake database also consists of earthquake records between 1800 and 1900 from Seeburger and Bolt (1976) and Topozada et al. (1978, 1981). In addition, we have also utilized the data from DMG Map Sheet 49 (Topozada et al., 2000).

The parameters used to define the limits of the historical earthquake search include geographical limits (within 100 km of the site), dates (1800 through May 2020), and magnitudes ( $M \geq 4$ ). A summary of the results of the historical search is presented in Table 4.5-1.

**Table 4.5-1**  
**Historical Seismicity**

|                                                                  |            |
|------------------------------------------------------------------|------------|
| Time Period (1800 to May 2020)                                   | 220+ years |
| Maximum Magnitude <sup>1</sup>                                   | 7.9        |
| Approximate distance to nearest historical $M \geq 4$ earthquake | 20 km      |
| Number of events exceeding magnitude 4 within search area        | 170        |

<sup>1</sup>Moment magnitude

#### 4.6 SOIL SITE CLASS

Based on the borings in the above referenced report, the supplemental borings performed, and a review of the geologic conditions within the vicinity of the project site, Site Class D would be appropriate for the seismic design of the new facility using the 2019 California Building Code (CBC). The parameters provided below are based on the 2019 CBC. The 2019 CBC is based on the 2018 International Building Code (IBC) and ASCE 7-16. For a 2019 CBC based design, the estimated Maximum Considered Earthquake (MCE) mapped spectral accelerations for 0.2 second and 1 second periods (SS and S1), associated soil amplification factor ( $F_a$ ), and mapped peak ground acceleration (PGA) are presented in Table 4.6-1. Corresponding site modified (SMS) and design (SDS) spectral accelerations, PGA modification coefficient ( $F_{PGA}$ ), PGAM, risk coefficients (CRS and CR1), and long-period transition period (TL) are also presented in the table below. Presented values were estimated using Section 1613.3 of the 2019 California Building Code (CBC), chapters 11 and 22 of ASCE 7-16, and the Structural Engineers Association of

California (SEAOC) and California Office of Statewide Health Planning and Development (OSHPD) U.S. seismic design maps.

**Table 4.6-1**  
**2019 CBC/ASCE 7-16 seismic design parameters**

| Parameter        | Value <sup>1</sup> | ASCE 7-16 Reference        |
|------------------|--------------------|----------------------------|
| Latitude         | 36.321241°         | -                          |
| Longitude        | -119.664210°       | -                          |
| S <sub>s</sub>   | 0.750g             | Fig 22-1                   |
| S <sub>1</sub>   | 0.271g             | Fig 22-2                   |
| Site Class       | D                  | Table 20.3-1               |
| F <sub>a</sub>   | 1.200              | Table 11.4-1               |
| F <sub>v</sub>   | NA                 | Table 11.4-2, Supplement 1 |
| PGA              | 0.325g             | Fig 22-9                   |
| S <sub>MS</sub>  | 0.900g             | Eq. 11.4-1                 |
| S <sub>M1</sub>  | NA                 | Eq. 11.4-2                 |
| S <sub>DS</sub>  | 0.600g             | Eq. 11.4-3                 |
| S <sub>D1</sub>  | NA                 | Eq. 11.4-4                 |
| F <sub>PGA</sub> | 1.275              | Table 11.8-1               |
| PGA <sub>M</sub> | 0.414g             | Eq. 11.8-1                 |
| C <sub>RS</sub>  | 0.922              | Fig 22-18A                 |
| C <sub>R1</sub>  | 0.927              | Fig 22-19A                 |
| T <sub>L</sub>   | 12 seconds         |                            |

<sup>1</sup>N/A\* = Not Applicable (refer to explanation below)

It should be noted that Section 11.4.8 of ASCE 7-16 requires a site-specific ground motion hazard analysis be performed for Site Class D sites with S<sub>1</sub> values greater than or equal to 0.2g unless structural design exceptions are taken. The subject site meets these criteria. We understand that CGS will assume the structural design exceptions will not be taken and that a site-specific ground motion hazard analysis will be performed. If exceptions are taken, then an F<sub>v</sub> value of 2.058 can be used only to calculate the T<sub>s</sub>, S<sub>M1</sub>, and S<sub>D1</sub> values and only for the purpose of invoking the exceptions in Section 11.4.8 of ASCE 7-16. The calculated S<sub>M1</sub> and S<sub>D1</sub> values based on the F<sub>v</sub> value of 2.058 shall not be used for any other calculations. The structural engineer is required to prepare a letter for submittal to OSHPD and CGS that confirms the exceptions will be taken, otherwise if the exceptions are not taken, a site-specific ground motion hazard analysis will be required.

## 4.7 POTENTIAL SEISMIC HAZARDS

A discussion of specific seismic hazards that could impact the site is included below. The hazards considered include: surface fault rupture; liquefaction and seismic settlement; lateral spreading; dynamic compaction; and cyclic softening.

### 4.7.1 Surface Fault Rupture

Earthquakes are caused by the sudden displacement of earth along faults with a consequent release of stored strain energy. The fault slippage can often extend to the ground surface where it is manifested by sudden and abrupt relative ground displacement. Damage resulting from fault rupture occurs where structures are located astride the fault traces that move. The subject site is not located within, nor is it adjacent to, a state designated Alquist-Priolo Earthquake Fault Zone (CGS, 2018). Based on the reviewed geologic/seismologic reports and maps, no known active, or potentially active faults cross or project toward the site. Therefore, the potential for fault-related surface rupture at the site is considered very low.

### 4.7.2 Liquefaction and Seismic Settlement

A common secondary hazard of strong ground shaking is the potential for soil liquefaction. Liquefaction describes a phenomenon in which saturated soil loses shear strength and deforms as a result of increased pore water pressure induced by strong ground shaking during an earthquake. Dissipation of the excess pore pressures will produce volume changes within the liquefied soil layer, which can manifest at the ground surface as settlement of structures, floating of buried structures, failure of retaining walls, lateral migration (lateral spreading), and extensional ground cracking of liquefied material. Factors known to influence liquefaction include soil type, structure, geologic age, grain size, relative density, confining pressure, depth to groundwater, and the intensity and duration of ground shaking. Soils most susceptible to liquefaction are saturated, loose, sandy soils.

Saturated granular sediments can experience liquefaction if subject to seismically induced ground motion of sufficient intensity and duration. Liquefaction analysis used procedures by Youd et. Al. (2001) and considered the relative density and fines content of the granular settlement. The liquefaction analysis also included screening for the potential for liquefaction utilizing the moisture content and Plasticity Index of fine grained non-cohesive and cohesive soils in accordance with

procedures set forth in Seed et al. (2003). The analysis considered a historic high groundwater depth of 25 feet bgs, ground acceleration ( $PGA_M$ ) of 0.414g, and earthquake moment magnitude  $M_w = 6.21$ .

A screening analysis was not performed for the potential of cyclic liquefaction occurring in the fine grained soils encountered within the boring but were included in the liquefaction analysis for conservatism. Therefore, the coarse and fine grained soil layers were evaluated for potential liquefaction using the cyclic liquefaction analysis model by Seed (2003). Liquefaction analysis performed on the fine grained and granular sediments indicates that liquefaction and seismically induced settlement may occur in the poorly graded sand layers encountered in borings B-6 at depths between 30 to 33 feet and 40 to 43 feet bgs. Also, liquefaction and seismically induced settlement may occur in poorly graded sand layers and deeper silty clay layers encountered in boring B-7 at depths between 38 to 40 feet and 46 to 51.5 feet bgs. However, due to the significant thickness of non-liquefiable overburden soil with moderate to high density, bearing loss is not likely to occur.

Seismically induced settlement due to liquefaction was evaluated to be 0.4 inches by Seed (2003) and 0.1-inch by Idriss and Boulanger (2008) in boring B-6 and 1.5 inches by Seed (2003) and 0.5 inches by Idriss and Boulanger (2008) in boring B-7. The general guidelines of the CGS indicate the differential seismically induced settlement between adjacent supports in a building would be about one-half the total settlement. This would result in an average differential settlement between adjacent supports of approximately 0.15-inch in boring B-6 and 0.5 inches in boring B-7. The anticipated differential settlements are low to moderate and are anticipated to be within the tolerance of the proposed structures and will not result in significant damage or collapse. We assume the structural engineer can accommodate this amount of settlement; therefore, no ground modification for mitigation against liquefaction and/or settlement is recommended.

#### 4.7.3 Lateral Spreading

Lateral spreading is a movement in a nearly horizontal soil zone (usually attributable to liquefaction) that causes the overlying soil mass to shift down a gentle slope or toward a free face such as incised water bodies. Because the site and surrounding areas have generally insignificant topographic relief and the site is not likely to experience significant liquefaction, the potential for lateral spreading is considered very low.



#### 4.7.4 Dynamic Compaction

Dry, loose sands and non-plastic silts may experience some dynamic compaction resulting in surface settlement when subjected to cyclic application of loads such as ground shaking from near-by-seismic events. Given the subsurface conditions encountered above groundwater, it is estimated (Tokimatsu and Seed, 1987) seismic settlement of the non-saturated soil at the site is anticipated to be less than 3/4-inch for analysis based on soil encountered in Borings B-6 and B-7 for both the current groundwater and historic high groundwater conditions.

#### 4.7.5 Cyclic Softening

While liquefaction describes a phenomenon in which saturated “sand-like” (or cohesionless) soils lose strength during an earthquake, cyclic softening describes the loss of strength of “clay-like” (or cohesive) soils during an earthquake. Various researchers agree that plasticity index (PI) is useful in determining if a soil behaves clay-like or sand-like; however, the value of PI for which a clay behaves like a sand is not agreed upon. For this investigation, we have relied upon the methods presented in Idriss and Boulanger (2008) which indicates that soils with a  $PI \geq 7$  behave like a clay. Based on the results of our field and laboratory investigation, and the depth to groundwater, no soft soils susceptible to cyclic softening were encountered at the site.

### 4.8 POTENTIAL GEOLOGIC HAZARDS

The following discusses potential geologic hazards that could impact construction at the project site, including: flooding; expansive soils; hydrocompaction; corrosive soils; regional subsidence; naturally occurring asbestos; and radon. Other geologic hazards such as landslide and volcanic eruption are not considered a potential hazard at this site.

#### 4.8.1 Flooding

##### 4.8.1.1 Tsunamis, Seiches, Earthquake Induced Flooding

Tsunamis are sea waves of unusual size that occur from significant earthquakes either under the ocean floor or adjacent to shorelines and can travel great distances to impact low-lying communities and developments. Considering that the Coast Range protects the site from the sea, the potential to be affected by a tsunami is nil.

A seiche is a free or standing wave oscillation that occurs in a confined body of water, such as a reservoir or lake. Earthquake-generated ground waves, which have a period that matches the natural period of the lake or reservoir, may cause the water to oscillate, which can cause damage to shore line improvements. The Kings County General Plan (KCGP) indicates that earthquake-induced seiches are not considered a risk within the vicinity of the project site.

#### 4.8.1.2 Potential for Dam Failure

According to the KCGP, two major dams could cause substantial flooding in Kings County in the event of a failure: Pine Flat and Terminus Dams. The project site is located within an area of potential flooding due to dam failure of Pine Flat Dam (see Figure 9). However, the KCGP does not state the potential inundation depth in the event of failure of Pine Flat Dam. The project site is not located within potential flooding of the Terminus Dam.

#### 4.8.1.3 Flood Insurance Rate Maps

According to the Federal Emergency Management Agency (FEMA), the majority of the project site lies within a Zone X flood designation (Map Number 06031C0185C, dated June 16, 2009) indicating areas of minimal flood hazard (see Figure 8). As such, the civil designer should plan site grades accordingly.

#### 4.8.2 Expansive Soils

Expansive soils were not encountered within the borings drilled for this study. Furthermore, based on review of soil survey by the NRCS, expansive soil was not identified within the project area. Expansive soils are not anticipated within the influence of foundation systems or zone of cyclic moisture changes therefore, will not dictate the need for special grading or special footing and concrete slab-on-grade design.

#### 4.8.3 Hydrocompaction (Soil Collapse)

Our experience has found that some of the alluvial soils in the San Joaquin Valley are subject to hydrocompaction. Hydrocompactive soil has a relatively loose skeletal structure, which is weakly cemented by soluble salts or a slight clay mineral content. Moisture increase breaks down the inter-particle cementation causing a collapse of the skeletal structure. The significant loss in soil volume can result in settlement of overlying structures. The project geotechnical exploration and

associated laboratory testing identified the in-place relative density of the subsurface soil was relatively low and compression characteristics were moderate. Based on laboratory testing, post saturation of four soil samples (Borings B-3 at 1-foot, B-9 at 2 feet, B-1 at 5.5 feet, and B-7 at 7.5 feet bgs) obtained from the site had compression characteristics that were low to moderate (approx. 2.0 to 5.0 percent compression upon induction with a normal load equal to 1,000 to 2,000 psf), indicating a possibility of collapse potential.

#### 4.8.4 Corrosive Soils

Kleinfelder has completed laboratory testing to provide data regarding corrosivity of onsite soils. Our scope of services does not include corrosion engineering and, therefore, a detailed analysis of the corrosion test results is not included in this report. A qualified corrosion engineer should be retained to review the test results and design protective systems that may be required. Kleinfelder may be able to provide those services. However, the results of the laboratory testing regarding corrosivity can be seen in Section 6.7.

#### 4.8.5 Regional Subsidence

Land subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. The KCGP does not identify subsidence within Kings County; however, the KCGP acknowledges soils particularly subject to subsidence include those with high silt or clay content and a high water table. Due to the significant depth to groundwater withdraw in the San Joaquin Valley, the occurrence of subsidence is typically regional and unlikely to affect isolated locations, as such, the potential for damaging differential settlement of the proposed new structures due to subsidence is very low.

#### 4.8.6 Naturally-Occurring Asbestos

CGS Open File Report 2000-019 (Churchill and Hill, 2000) indicates the most proximal ultramafic bedrock likely to contain naturally occurring asbestos (NOA) is located approximately 35 miles east of the site. The project site is underlain by fluvial and alluvial deposits derived from Sierra Nevada and foothills which may contain small amounts of NOA. However, NOA is not likely to be a significant risk at the site.

#### 4.9 Radon Gas

Radon gas is a naturally occurring colorless, tasteless, and odorless radioactive gas that forms in soils from the decay of trace amounts of uranium that are naturally present in soils. Radon enters buildings from the surrounding soil through cracks or other openings in foundations, floors over crawlspaces, or basement walls. Once inside a building, radon can become trapped and concentrate to become a health hazard unless the building is properly ventilated to remove radon. Long-term exposure to elevated levels of radon increases one's risk of developing lung cancer.

The U.S. Environmental Protection Agency (EPA) recommends that all homes (or structures intended for human occupancy) be tested for radon whatever their geographic location. The U.S. EPA recommends that action be taken to reduce radon in structures with an average annual level higher than four picocuries per liter (4.0pCi/l).

The California Department of Health Services (2016) performed 88 tests within Kings County (last updated on February 2016) where the project site is located. Of the 88 tests, 10 reported a minimum of four (4) picocuries per liter.

The noted testing is not intended to represent the entire county area for determining which buildings have excessive indoor radon levels. In addition to geology, indoor radon levels can be influenced by local variability in factors such as soil permeability and climatic conditions, and by factors such as building design, construction, condition, and usage. Consequently, building specific radon levels can only be determined by indoor radon testing. No warranty as to actual radon levels at specific sites in Kings County is expressed or implied by the noted test results. Consideration should be given to consult a radon specialist to provide appropriate tests and recommendations to review Radon gas concerns.

## 5 EARTHWORK

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### 5.1 GENERAL

Based on the results of the various field and laboratory testing, and the geotechnical analysis conducted by Kleinfelder, it is geotechnically feasible to develop the site using conventional grading and foundation construction techniques.

### 5.2 HYDROCOMPACTION

The near surface soils to a depth of about 10 feet bgs are subject to moderate hydrocompaction. Hydrocompactive soil has a loose skeletal structure, which is weakly cemented by soluble salts and/or minor amounts of clay. Increases in soil moisture reduce the interparticle cementation (dry strength) of the soil resulting in a decrease in the volume of the soil structure. This condition can lead to post construction settlement of structures if soils subsequently become wetted.

At the present moisture content, the on-site natural soil has sufficient strength to support the proposed preliminary improvements. However, should the soil be subject to post-construction moisture increases, minor to moderate soil compression will likely occur. The amount of compression will be dependent upon imposed loads, depth of moisture increase, and the amount of moisture increase. The potential post construction settlement in building areas due to the presence of these hydrocompactive soils is anticipated to range from approximately 2.7 to 3.6 inches for strip footings supporting loads up to 5 kips per lineal foot and approximately 3.5 to 4.0 inches for column footings supporting loads up to 200 kips. These settlements include an assumed 12 inches of building pad fill above the current site grade and the bottom of footings founded at a depth of 18 inches below the assumed building pad elevation. Based on past experience and the variability of future moisture increase, the potential settlement could be totally differential over a distance of about 15 feet. The collapse potential test data indicated that most of the post construction settlement is due to overburden pressure of the existing in-place soil. Therefore, should moisture levels increase in the upper 10 feet, post construction settlement below hardscape areas (i.e. driveways, sidewalks, pavements, etc.) is anticipated to be approximately 1.8 inches due to the self-weight of the in-place soil. Most of the settlement below buildings and site improvements occurs between depths of approximately 5 and 10 feet bgs.



For preliminary purposes, it is assumed future structures may not tolerate the potential post construction settlement described above. Consequently, mitigating the potential effect of these soils will be necessary to support foundations. Over-excavation is an effective means of mitigating the potential settlement due to hydrocompaction. Excavation and recompaction of the hydrocompactive soils is recommended to a depth of 7 feet below existing grade and to a distance of at least 10 feet beyond the perimeter of the planned buildings and surrounding improvements (i.e. hardscape, planters, awnings, etc.) that could be sensitive to settlement. The perimeter of the overexcavated areas should be sloped at a gradient of 1.5:1 H:V, or flatter, to provide a transition between deep and shallow excavated areas. The recompaction depth of 7 feet may be accomplished by a combination of overexcavation and scarification depths. For example: the contractor may choose to overexcavate the soil to a depth of 5.5 feet bgs scarify the exposed soil to a depth of 18 inches, moisture condition to at, or above optimum moisture and compacted with a vibratory open hub ring compactor (e.g. Rex compactor) capable of compacting thicker lifts. If conventional sheepsfoot drum compactors are utilized, the scarified depth would need to be decreased and overexcavation depth increased to achieve the overall recompaction depth of 7 feet. The excavated soil could be used as engineered fill (refer to Section 5.4.1). With these recommendations, the post construction settlement due to hydrocompaction below structures would be reduced to approximately 1-inch.

Site improvements outside of the building envelopes described above (e.g. general hardscape, pavements, utilities, etc.) would also be subject to settlement due to hydrocompaction under the self-weight of the overburden soil and surface improvements. The total depth of overexcavation plus scarification and recompaction is 7 feet to reduce settlement below site improvements to less than 1-inch. However, the depth of earthwork to mitigate hydrocompactive soil to protect surface improvements outside of the building envelopes may be cost prohibitive. Therefore, consideration could be given to supporting these improvements on partial overexcavation and recompaction to a depth of 18 inches to provide uniform bearing support only without mitigating the potential total settlement of 1.8 inches.

With the above earthwork mitigation recommendations, controlling infiltration into the subgrade soils is very important in reducing the chance for post construction settlement. Sources of water or moisture intrusion would likely be limited to rainfall and runoff from the roof of proposed buildings, landscape irrigation, and utility leaks/failures. To aid in reducing potential saturation of subgrade soils, roof run-off is encouraged to be piped to the storm drain system and landscape irrigation be held to a minimum and use only sufficient water to sustain and promote plant growth (e.g. drip irrigation).

If site grades will be raised more than 1-foot above existing site grade, Kleinfelder should be contacted to provide further recommendations as additional over-excavation of the hydrocompactive soil below improvements may be warranted due to higher surcharge loads and greater settlement than estimated above.

If the described amount of remaining post construction settlement after overexcavation and recompaction exceeds the tolerance of structures and surface improvements or the settlement presents an adverse risk to the developer, then the hydrocompactive soils would require recompaction to a depth of 10 feet bgs.

### 5.3 SITE PREPARATION

#### 5.3.1 Stripping

At the time of the reconnaissance, the project site was covered with a moderate growth of seasonal grasses and weeds. All surface vegetation, organic material, and any miscellaneous surface obstructions (including pavement) should be removed from the project area, prior to any site grading. It is anticipated stripping of surface vegetation could involve the upper 2 to 3 inches. Surface strippings should not be incorporated into fill unless they can be sufficiently blended to result in an organic content less 3 percent by weight (ASTM D2974).

#### 5.3.2 Disturbed Soil, Undocumented Fill, and Subsurface Obstructions

Initial site grading should include a reasonable search to locate any disturbed soil, undocumented fill soils and underground structures (such as irrigation pipes) or utilities that may exist within the area of construction. Any such obstructions should be removed from the project area. Undocumented fill or loose soil should be excavated and may be reused provided it meets the applicable requirements for engineered fill (see Section 5.4). Any disturbed soil, pockets of soft or loose soils, void spaces created by burrowing animals or undocumented fill, which are encountered, should be excavated to expose firm native material.

At the time of the investigation, loose sediments within Peoples Ditch was probed to a depth of approximately 2 to 2.5 feet below the ditch bottom. All vegetation, soft sediments, organic material, and debris should be removed from the ditch profile and bottom to expose firm unyielding

soil conditions. The exposed subgrade should be approved prior to placement of pipe bedding and or pipeline construction.

### 5.3.3 Over-excavation and Scarification

Over-excavation is typically reserved for soils that, in their natural state, will not provide adequate bearing for structures. The native soils are hydrocomapactive and could lead to non-uniform bearing conditions and differential settlement of the proposed building improvements. Therefore, mitigation by over-excavation and recompaction is recommended to mitigate potential post construction settlement below structures and site improvements. The perimeter of overexcavated areas should be sloped and benched to receive fill in accordance with Section 5.4.2.

The recompaction depths discussed below may be accomplished by a combination of overexcavation, scarification, and recompaction. The depth of scarification and recompaction is dependent on the ability of the equipment to successfully moisture condition and compact the scarified zone and may be adjusted buy the contractor for compatibility of the equipment provided the overall re compaction depth specified is met.

Note that the overexcavation and scarification depths described herein are minimum depths. If additional depths of earthwork are specified in the Project Plans and Specifications or by the developer, the contractor shall perform the required overexcavation and recompaction to meet the more stringent requirements.

#### *Building Envelope*

After performing removals described in Sections 5.3.1 and 5.3.2, the planned buildings and surrounding improvements (i.e. hardscape, planters, awnings, etc.) that are sensitive to settlement should be over-excavated to a minimum depth of 5.5 feet bgs. The bottom of the excavation should be scarified to a depth of 18 inches, moisture conditioned, and recompacted as described in Section 5.4. The lateral limits of the over-excavation should include the building area and extend at least 10 feet beyond the perimeter of the outer lines of the foundations and surrounding improvements (i.e. hardscape, planters, awnings, etc.). The excavated soil may be reused as engineered fill when placed, moisture conditioned, and compacted as described in Section 5.4.

## *Outside Building Envelope*

After performing removals described in Sections 5.3.1 and 5.3.2, site improvements outside the building envelope described in Section 5.2 Hydrocompaction, areas to receive surface improvements (e.g. general hardscape, pavements, utilities, etc.) should be over-excavated to a depth of 1-foot bgs. The bottom of the excavation should be scarified to a depth of 6 inches, moisture conditioned, and recompact as described in Section 5.4. The lateral limits of the over-excavation in planned foundation areas should include the surface improvements area and extend at least 3 feet beyond the perimeter of improvements. The excavated soil may be reused as engineered fill when placed, moisture conditioned, and compacted as described in Section 5.4.

## 5.4 ENGINEERED FILL

### 5.4.1 Materials

All engineered fill soils should be nearly free of organic or other deleterious debris and less than 3 inches in maximum dimension. The native soil materials, exclusive of debris, may be used as engineered fill provided they contain less than 3 percent organics by weight (ASTM D2974).

Recommended requirements for any imported soil to be used as engineered fill, as well as applicable test procedures to verify material suitability, are provided on Table 5.4-1.

**Table 5.4-1  
Soil Materials Test Procedures**

| Gradation               |                         | Test Procedures   |                       |
|-------------------------|-------------------------|-------------------|-----------------------|
| Sieve Size              | Percent Passing         | ASTM <sup>1</sup> | Caltrans <sup>2</sup> |
| 76 mm (3 inch)          | 100                     | C136              | 202                   |
| 19 mm (¾ inch)          | 80 – 100                | C136              | 202                   |
| No. 4                   | 70 – 100                | C136              | 202                   |
| No. 200                 | 20 – 70                 | C136              | 202                   |
| <u>Plasticity</u>       |                         |                   |                       |
| <u>Liquid Limit</u>     | <u>Plasticity Index</u> |                   |                       |
| < 25                    | < 12                    | D4318             | 204                   |
| <u>Expansion Index</u>  |                         |                   |                       |
| < 20                    |                         | D4829             | -                     |
| <u>Soluble Sulfates</u> |                         |                   |                       |
| < 2000 ppm              |                         | -                 | 417                   |
| <u>Soluble Chloride</u> |                         |                   |                       |
| <300 ppm                |                         | -                 | 422                   |
| <u>Resistivity</u>      |                         |                   |                       |
| >1000 ohm-cm            |                         | -                 | 532                   |

Notes:

<sup>1</sup> American Society for Testing and Materials Standards (latest edition)

<sup>2</sup> State of California, Department of Transportation, Standard Test Methods (latest edition)

Any imported fill materials to be used for engineered fill should be sampled and tested by a representative of the project Geotechnical Engineer prior to being transported to the site.

#### 5.4.2 Benching

Where fill will be placed on slopes steeper than 5:1 (H:V), it will be necessary to bench the slope to receive fill as successive filling operations are performed. Benches should be constructed approximately every 1.5 feet (slope height less than 5 feet) or every 2.5 feet (slope height greater than 5 feet) of vertical fill thickness. Benching should begin at one bench height above the toe of the slope. Where fill will be placed in small pits or excavations, benching is not required, however, all loose soil should be removed from the invert and sides and the area made dish-shaped to



receive fill. Any loose soil excavated during site preparation may be used as fill, provided it meets the requirement for engineered fill.

Compaction equipment should provide kneading effort (e.g. with sheeps foot rollers) to enhance uniformity and minimize stratification.

#### 5.4.3 Compaction Criteria

Soils used for engineered fill should be uniformly moisture conditioned to at, or above optimum moisture, placed in horizontal lifts less than 8 inches in loose thickness, and compacted to at least 90% relative compaction. Disking and/or blending may be required to uniformly moisture-condition soils used for engineered fill. The specified compaction shall be increased to at least 95% relative compaction in the top 12 inches of the subgrade soil in pavement areas as indicated in Section 6.5, Pavements.

#### 5.4.4 Construction Considerations

Should site grading be performed during or subsequent to wet weather, near-surface site soils may be significantly above optimum moisture content. These conditions could hamper equipment maneuverability and efforts to compact site soils to the recommended compaction criteria. Disking to aerate, chemical treatment, replacement with drier material, stabilization with a geotextile fabric or grid, or other methods may be required to mitigate the effects of excessive soil moisture and facilitate earthwork operations. Any consideration of chemical treatment (e.g. lime) to facilitate construction would require additional soil chemistry evaluation and could affect landscape areas and some construction materials (e.g. aluminum).

If construction is performed during dry, hot or windy weather, it may be necessary to periodically apply surface watering to counter evaporative loss or re-establish moisture prior to constructing slabs (see Section 6.3.1).

## 5.5 TEMPORARY EXCAVATIONS

### 5.5.1 General

All excavations must comply with applicable local, State, and Federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety is generally the responsibility of the contractor, who shall also be solely

responsible for the means, methods, and sequencing of construction operations. The information below is provided as a service to the client. Under no circumstances should the information provided be interpreted to mean that Kleinfelder is assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

### 5.5.2 Excavations and Slopes

The contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, State, and/or Federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced and, if they are not followed, the owner, contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.

All excavations should be constructed and maintained in conformance with current OSHA requirements (29 CFR Part 1926). The on-site soils are best represented by OSHA Type C soil.

### 5.5.3 Construction Considerations

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should be kept sufficiently away from the top of any excavation to prevent any unanticipated surcharging. If it is necessary to encroach upon the top of an excavation, Kleinfelder can provide comments on slope gradients or loads on shoring to address surcharging, if provided with the geometry. Shoring, bracing, or underpinning required for the project (if any), should be designed by a professional engineer registered in the State of California.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff should be collected and disposed of outside the construction limits.

## 5.6 PIPELINE AND TRENCH BACKFILL

### 5.6.1 Materials

Pipe embedment zone backfill (i.e., bedding, haunching, pipe zone and initial backfill per ASTM D2321) should consist of soil compatible with design requirements for the specific types of pipes. It is recommended the project designer or pipe supplier develop the final material specifications based on planned pipe types, bedding conditions, tolerable deflection and other factors beyond the scope of this study. Randomly excavated on-site soil from the predominate site profile will likely be a combination of Class III and IVa material per ASTM D2321.

With respect to the design of the Peoples Ditch pipeline, Kleinfelder recommends a minimum Type 2 installation and use of select bedding and haunching material consisting of Category II (GM, SM, GC, and SC with less than 20 percent passing the #200 sieve). The thickness of the bedding (inches) should be based on the outer diameter  $D_o/24$ .<sup>1</sup>

Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of native soil that meets the requirements for engineered fill.

### 5.6.2 Compaction Criteria

All trench backfill should be placed and compacted in accordance with recommendations provided above for engineered fill. Reduced compaction (85% minimum) could be specified for trench zone backfill in non-structural areas. Mechanical compaction is recommended; ponding or jetting should not be used.

Table 5.6-1 provides estimated geotechnical parameters for designers to consider in evaluating pipe zone backfill criteria that is compatible with pipe types and deformation tolerances.

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<sup>1</sup> *Concrete Pipe Design Manual, American Concrete Pipe Association*

**Table 5.6-1  
Pipe Zone Backfill Parameters**

| Soil Stiffness Modulus (psi)                    |                                  |                           | Backfill Density (pcf)    |                           |
|-------------------------------------------------|----------------------------------|---------------------------|---------------------------|---------------------------|
| <b>E'<sub>n</sub><br/>(Trench<br/>Sidewall)</b> | <b>E'<sub>b</sub> (Backfill)</b> |                           | <b>85%<br/>Compaction</b> | <b>90%<br/>Compaction</b> |
|                                                 | <b>85%<br/>Compaction</b>        | <b>90%<br/>Compaction</b> |                           |                           |
| 3000                                            | 900                              | 1350                      | 118                       | 125                       |

$E'_n$  represents the modulus for the undisturbed natural soil and is based on relative density data by Howard (1996).  $E'_b$  is the modulus for backfill derived from random excavation of on-site soil and is based on data by Hartley and Duncan (1982) and Watkins and Anderson (2000). The design  $E'$  will be dependent upon the pipe diameter and trench width, which dictates the relative influence of  $E'_n$  and  $E'_b$ . Methods by Howard (1996) are suggested for evaluating the design  $E'$ . Kleinfelder can furnish a recommended design  $E'$ , if provided with pipe diameter and specifications for trench construction.

In evaluating the maximum load ( $W_d$ ) on pipes, a  $k\mu'$  ( $k=0.31$  and  $\mu'=0.62$ ) of 0.19 can be used in determining the load coefficient factor  $C_d$ .

### 5.6.3 Pipeline Thrust

The lateral thrust on pipelines can be resisted by friction between the pipe and native or imported backfill soil and lateral bearing on thrust blocks. The allowable frictional resistance between the pipe and backfill comprised of on-site soil or select import sand backfill is provided in Table 5.6-2.

**Table 5.6-2  
Frictional Coefficients**

| <b>Pipe Material</b>                                            | <b>Allowable Frictional Coefficient</b> |                     |
|-----------------------------------------------------------------|-----------------------------------------|---------------------|
|                                                                 | <b>Sustained Loading</b>                | <b>Test Loading</b> |
| Smooth Plastic or Steel (native soil or imported sand backfill) | 0.19                                    | 0.23                |

The lateral load on shallow thrust blocks (block height greater than 70 percent of depth to center of pipeline) poured against undisturbed soil can be resisted by the passive lateral bearing provided in Table 6.1-3. The estimated horizontal deflection in Table 6.1-3 would also be applicable to shallow thrust blocks.

## 5.7 ESTIMATED VOLUME LOSS

Based on the in-place densities obtained from the test borings and the Modified Proctor tests, it is estimated the volume loss from cut to fill in the upper 5 feet across the proposed project area may range from about 5 percent to 22 percent, depending on the relative compaction achieved. Table 5.7-1 provides the estimated volume loss due to recompaction of the near surface soils of the site to relative compaction levels of 90 and 95 percent for engineered fill below improvement areas.

The volume loss associated with recompaction was based on an average maximum dry density of 123 lbs/ft<sup>3</sup> and an average compaction during construction of 2 percent above the required compaction levels of 90 and 95 percent. The estimated volume loss considers the in-place density in the upper 5 feet of the site soils. Volume loss within the deeper portions of the proposed improvements are anticipated to equal, or less.

**Table 5.7-1  
Average Volume Loss**

| Depth (ft) | Average Volume Loss |                |
|------------|---------------------|----------------|
|            | 92% Compaction      | 97% Compaction |
| 0 – 5      | 12.5                | 17.0           |

The calculations for developing estimates of an earthwork factor are based on very limited data, and caution should be exercised in the application of this factor in cost estimating and volume calculations. The volume of material tested for in-place density is commonly as small as one ten-thousandth of one percent of the total volume of material to be excavated. Subjective assumptions must be made to perform the calculations, which can affect the accuracy of the results. These include the anticipated relative compaction of the material when placed as fill and uniformity of the materials. In addition, the volume loss estimates in Table 5.7-1 are based only on undisturbed density tests and two (2) Modified Proctor tests and do not consider other forms of loss (e.g. stripping, grubbing, spillage, wastage, or subsidence), which can be substantial.



## 6 DESIGN RECOMMENDATIONS

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### 6.1 SPREAD FOUNDATIONS

#### 6.1.1 General

The proposed structures may be supported by conventional shallow footings supported on approved properly engineered fill. The following preliminary recommendations are based on the assumption that the recommendations in Section 5, "Earthwork", have been implemented. Recommendations regarding the geotechnical aspects of building design are presented below.

#### 6.1.2 Allowable Vertical Bearing Pressures and Settlements

Generally, two geotechnical issues determine the design bearing pressure for conventional spread footing foundations: (1) strength of the foundation soil and (2) tolerable settlement. The on-site soil in its current condition has enough strength to support the proposed improvements. However, due to the hydrocompactive soils present at the site, the available bearing capacity should be limited to reduce the anticipated settlement of the proposed improvements. Table 6.1-1 provides the net allowable bearing pressures for use in foundation design.

**Table 6.1-1**  
**Available Allowable Bearing**

|                             | Available Allowable Bearing (psf) |
|-----------------------------|-----------------------------------|
| Static Loading              | 1500                              |
| Total Combined Loading      | 3000                              |
| Unfactored Ultimate Bearing | 4000                              |

The above values are appropriated for design using the Basic and Alternate Load Combinations in Section 1605.3 of the 2019 CBC.

Analysis, based on Schmertmann, determined the following estimate static settlement based on a range of assumed structural loads. The settlement assumes the sustained load on the footings is equal to 80 percent of the net bearing pressure. Settlement is expected to occur primarily throughout the construction process.

**Table 6.1-2**  
**Estimated Settlement**

| <b>Footing Type</b> | <b>Loading<br/>(DL +LL)</b> | <b>Estimated Settlement<br/>(inch)</b> |
|---------------------|-----------------------------|----------------------------------------|
| Strip               | To 5.0 kip/ft               | Less than 0.25                         |
| Square              | 50 kips                     | Less than 0.25                         |
|                     | 100 kips                    | 0.50                                   |
|                     | 200 kips                    | 0.85                                   |

The differential settlement between similarly loaded footings would equal approximately half of the anticipated settlement represented in Table 6.1-2. The post construction settlement due to hydrocompaction if the soils subsequently become saturated would be differential over a distance of approximately 15 feet. Therefore, the total differential settlement between foundations would be the sum of the differential settlement between footings from Table 6.1-2 plus the differential settlement due to hydrocompaction after earthwork mitigation discussed in Section 5.2.

If deemed necessary by the design engineer, Kleinfelder can provide the estimated settlement for other loading conditions. The design bearing pressures are net values so the weight of embedded concrete does not need to be included in the foundation loading.

A modulus of subgrade reaction,  $K_1$  ( $B_p = 1$  foot), of 315 pci can be used for undisturbed on-site soil and 315 pci can be used for engineered fill. If the fill thickness is less than 2 feet, a composite  $K_1$ , could be evaluated. It should be noted the subgrade modulus reflects the response of the subgrade under primarily elastic conditions and small deflections. It is not a characteristic intended to define soil compressibility (settlement) or load-bearing capacity.

### 6.1.3 Lateral Resistance

Lateral loads applied to foundations can be resisted by a combination of lateral bearing and frictional resistance. The allowable lateral bearing and frictional coefficient for the foundations are presented in Table 6.1-3.

**Table 6.1-3**  
**Passive Pressures and Frictional Coefficients**

|                                                        | Allowable |                | Ultimate |
|--------------------------------------------------------|-----------|----------------|----------|
|                                                        | Static    | Total Combined |          |
| Frictional Coefficient                                 | 0.42      | 0.50           | 0.62     |
| Passive Pressure (psf/ft of depth)                     | 290       | 387            | 580      |
| Lateral Translation Needed to Develop Passive Pressure | 0.003D    | 0.006D         | 0.018D   |

Note: D is the footing depth

If the deflection resulting from the strain necessary to develop the passive pressure is within structural tolerance, the passive pressure and frictional resistance can be used in combination. Otherwise, additional passive pressure values could be provided based on tolerable deflection. The allowable values already incorporate a factor of safety and, as such, would be compared directly to the driving loads. If analytical approaches require the input of a safety factor, the ultimate values would be used.

## 6.2 EARTH RETAINING STRUCTURES

The lateral earth pressure against retaining structures will be dependent upon the ability of the wall to deflect. Presented in Table 6.2-1 is the active, at-rest and braced lateral earth pressure for level on-site soil. The active pressure is applicable to walls able to translate to 0.0005 radians at the top or bottom. The at-rest soil pressure is applicable to retaining structures that are fully fixed against both rotation and translation. Walls restrained from translation at the top and bottom, but able to deflect 0.0005 radian between restrained points should be designed for the braced lateral pressure. The at-rest pressures are applicable to walls fully fixed against translation or rotation. The at-rest pressures include the Jaky solution for normally consolidated soil plus consideration for the locked-in pressure associated with the pre-stressing due to backfill compaction (over-consolidation).

**Table 6.2-1**  
**Lateral Earth Pressure**

| Loading Conditions                 | Lateral Earth Pressures |
|------------------------------------|-------------------------|
| Active Pressure (psf/ft of depth)  | 38                      |
| Braced Pressure (psf)              | 25 H                    |
| At-Rest Pressure (psf/ft of depth) | 84                      |

H in the expression represents the retained height in feet (measured from finished grade to bottom of footing). The earth pressures presented above assume saturated conditions. The earth pressures do not include hydrostatic pressures; therefore, wall should be adequately drained to prevent the build-up of hydrostatic pressure.

Retaining wall foundation design can utilize the passive pressures and sliding resistance given in Table 6.1-3 and allowable bearing capacity given in Section 6.1-1. When utilizing the available allowable bearing capacities of Table 6.1-1, the value for static loading would represent the average bearing for the footing and the value for total combined loading would represent the allowable maximum toe pressure.

### 6.3 CONCRETE SLABS-ON-GRADE

#### 6.3.1 Subgrade Preparation

Any building slabs-on-grade should be supported on engineered fill placed as described in Section 5 of this report. The slab subgrade, to a depth of 12 inches, should have a moisture content of at least optimum immediately prior to pouring the slab or placing a vapor retarding membrane.

#### 6.3.2 Capillary and Moisture/Vapor Break

Considering the soil type and regional groundwater depth, a capillary break (i.e. clean sand or gravel layer) is not necessary.

If the building contains component which might be adversely affected by moisture, it is recommended that the slab subgrade be covered by vapor retarding membrane, such as 10-mil polyorfin. If design should incorporate a gravel subgrade layer, the membrane should have a minimum thickness of 15-mil. The subgrade surface should be smooth and care should be exercised to avoid tearing, ripping, or otherwise puncturing the vapor retarding membrane. If the vapor retarding membrane becomes torn or disturbed, it should be removed and replaced or properly patched. It is recommended consideration be given to placing concrete directly on the vapor retarding membrane. If desired by designers, the vapor retarding membrane could be covered with approximately 1 to 2 inches of saturated surface dry (SSD), relatively clean sand to protect it during construction. Concrete should not be placed if sand overlying the vapor barrier

has been allowed to attain a moisture content greater than about 5% (due to precipitation or excessive moistening). Excessive water beneath interior floor slabs could result in future significant vapor transmission through the slab, adversely affecting moisture-sensitive floor coverings and the indoor environment.

It should be noted that, although the slab support discussed above is currently the industry standard, this system might not be completely effective in preventing floor slab moisture vapor transmission problems. This system will not necessarily assure that floor slab moisture transmission rates will meet floor-covering manufacturer standards and that indoor humidity levels will not inhibit mold growth. A qualified specialist(s) with knowledge of slab moisture protection systems, flooring design and other potential components that may be influenced by moisture, should address these post-construction conditions separately. The purpose of a geotechnical study is to address subgrade conditions only, and consequently, it does not evaluate future potential conditions.

### 6.3.3 Conventional Slab Design

There are no geotechnical considerations (e.g. expansive soil), which would require special design of slabs. Therefore, the thickness and reinforcement of slabs-on-grade should be determined by structural considerations and should be designed by the project structural engineer or building designer. A modulus of subgrade reaction,  $K_1$  ( $B_p = 1$  foot), of 315 pci may be used for elastic analysis of slabs on at least 8 inches of properly compacted native or similar soil.

Slab concrete should have good density, a low water/cement ratio, and proper curing to promote a low porosity. It is recommended the water/cement ratio not exceed 0.45 to minimize vapor transfer.

Consideration should be given to construction/control joint spacing and/or some form of reinforcement of exterior slabs to aid in crack control.

## 6.4 PIER/POLE FOUNDATIONS

### 6.4.1 Allowable Vertical Axial Capacity and Settlement

Structures such as light poles, signs, canopies, etc., can be supported by pier/pole foundations. Should design incorporate the use of pier/pole foundations, Table 6.4-1 provides expressions for



the allowable and ultimate axial capacity using friction to resist axial loads. If the design of the pier/pole foundations includes end bearing to resist axial loads, the design may utilize the bearing capacity expressions given in Table 6.2-1, up to an allowable bearing capacity of 1,500 psf for static loading (D.L. + long term L.L.). The end bearing capacity may be increased 50 percent for total combined loading (D.L. + L.L. + transient loading, such as wind or seismic).

**Table 6.4-1**  
**Allowable Axial Capacity**

|                              | Frictional Resistance for Vertical Loads in Compression (lbs) |
|------------------------------|---------------------------------------------------------------|
| Static Loading               | 50 DL <sup>2</sup>                                            |
| Total Combined Loading       | 65 DL <sup>2</sup>                                            |
| Unfactored Ultimate Capacity | 100 DL <sup>2</sup>                                           |

Note: 1) D is pier diameter in feet and L is embedment length in feet.  
2) The allowable uplift resistance would be 70 percent of the compressional resistance.

The total settlement of friction piers designed in accordance with the above recommendations should be less than 0.002 times the pier diameter in inches. If design incorporates end bearing to resist axial loading, the estimated settlement would increase to approximately 0.018 times the pier diameter in inches. The concrete mix and reinforcement for drilled pier/caisson foundations should be designed by the project structural engineer.

#### 6.4.2 Lateral Resistance

Methods by ASHTO and Caltrans can be used to evaluate the lateral capacity of pier footings. The allowable passive pressure to resist lateral loads on isolated piers for use in these methods may be taken as 510 psf per foot of depth of embedment. The passive pressure may be increased by one-third for the total combined loads, including wind and seismic. The passive pressure values already consider arching and, as such, should not be increased further.

The allowable passive pressure provided above would not be appropriate for use in place of the values given in Table No. 1806.2 of the 2019 California Building Code (CBC) if pier foundation design utilizes the pole formulas in the CBC. If design uses the pole formulas in the CBC, the appropriate class of material in Table 1806.2 would be No. 4 (Silty Sand). Based on the strength of the on-site soils, a lateral bearing pressure of 170 psf/ft of embedment below the site grade may be used in place of the value given in Table 1806.2.

The passive pressure only considers soil strength. Tolerable pier deflection may govern the design lateral resistance. If provided with pier geometry, lateral load, and loading eccentricity, Kleinfelder can provide the estimated pier head deflection.

#### 6.4.3 Design and Construction Considerations

Prior to placing steel or concrete, footing excavations should be cleaned of all debris, loose or soft soil, and water. All footing excavations should be observed by the project Geotechnical Engineer just prior to placing steel or concrete. The purpose of these observations is to check that the bearing soils actually encountered in the foundation excavations are similar to those assumed in analysis and to verify the recommendations contained herein are implemented during construction.

### 6.5 PAVEMENT DESIGN

#### 6.5.1 General

The subgrade R-value for the on-site soil was evaluated in the laboratory on seven (7) near surface soil samples taken throughout the project site. The locations of the tested R-values were chosen in areas of proposed pavements based on a preliminary site plan. The laboratory tests were performed in conformance to Caltrans Test Method 301 and were evaluated based on stabilometer and expansion dial readings. The soil tested revealed that expansion pressure generally governs the design R-value. The R-value test results included in Appendix B indicate the R-value by exudation and includes the expansion pressures. The design R-value is dictated by expansion pressure and Traffic Index (TI). Consequently, the design R-value varies with Traffic Index.

Detailed vehicular load and frequency information is not available for the on-site pavements. Traffic within the project site is anticipated to consist of access for automobiles, trash collection, and delivery truck traffic. Consequently, a range of pavement sections have been provided for the on-site based on Traffic Indexes (T.I.'s) of 4.5 through 8.0. These traffic design assumptions should be reviewed for compatibility with the actual development, and revised pavement sections developed, as necessary.

## 6.5.2 Flexible Pavement

The preliminary flexible pavement design recommendations presented below are based upon the California Department of Transportation (Caltrans) design procedures. The flexible asphalt concrete pavement sections associated with the assumed T.I.'s and design R-value for on-site asphalt pavements are summarized in Table 6.5-1.

**Table 6.5-1**  
**Recommended Minimum Pavement Sections**

| <b>Traffic Index</b> | <b>Design R-Value (Expansion)</b> | <b>Asphalt Concrete</b> | <b>Aggregate Base (Min. R-value: 78)</b> | <b>Aggregate Subbase (Min. R-value: 50)</b> |
|----------------------|-----------------------------------|-------------------------|------------------------------------------|---------------------------------------------|
| 4.5                  | 11                                | 2.5"                    | 8.5"<br>2.0"                             | -<br>7.0"                                   |
| 5                    | 12                                | 3.0"                    | 8.5"<br>2.0"                             | -<br>7.0"                                   |
| 5.5                  | 13                                | 3.0"                    | 10.5"<br>3.0"                            | -<br>8.0"                                   |
| 6.0                  | 14                                | 3.5"                    | 11.0"<br>3.5"                            | -<br>8.0"                                   |
| 6.5                  | 16                                | 4.0"                    | 11.5"<br>3.5"                            | -<br>8.5"                                   |
| 7.0                  | 17                                | 4.0"                    | 12.5"<br>4.5"                            | -<br>9.0"                                   |
| 7.5                  | 18                                | 4.5"                    | 13.0"<br>5.0"                            | -<br>9.0"                                   |
| 8.0                  | 19                                | 5.0"                    | 13.5"<br>5.0"                            | -<br>9.5"                                   |

The design criteria assume a 20-year design period and that normal maintenance (crack sealing, etc.) is performed. The traffic index is a measure of the volume of truck traffic that will be applied to a pavement section in the design life. The allowable average daily truck traffic (ADTT) for the assumed traffic indexes is presented in Table 6.5-2.

**Table 6.5-2  
Average Daily Truck Traffic**

| <b>Traffic Index</b> | <b>2-Axle Vehicle</b> | <b>or</b> | <b>3-Axle Vehicle</b> | <b>or</b> | <b>5-Axle Vehicle</b> |
|----------------------|-----------------------|-----------|-----------------------|-----------|-----------------------|
| 4.5                  | 2.2                   |           | 0.8                   |           | 0.2                   |
| 5.0                  | 5.2                   |           | 2.0                   |           | 0.5                   |
| 5.5                  | 11.6                  |           | 4.3                   |           | 1.1                   |
| 6.0                  | 24.1                  |           | 9.0                   |           | 2.4                   |
| 6.5                  | 47.3                  |           | 17.7                  |           | 4.7                   |
| 7.0                  | 88.1                  |           | 33.0                  |           | 8.8                   |
| 7.5                  | 157.3                 |           | 59.0                  |           | 15.8                  |
| 8.0                  | 270.6                 |           | 101.5                 |           | 27.1                  |

The flexible pavement should conform to, and be placed in accordance with, Caltrans Standard Specification (2019). The aggregate base (Class 2) should comply with Section 26 of the Caltrans Standard Specifications. The aggregate subbase (Class 2) should comply with the specifications in Section 25. The aggregate base, aggregate subbase, and upper 12 inches of subgrade should be compacted to 95 percent relative compaction as determined by Caltrans Test Method No. 216 (dry weight comparison) or ASTM D1557 test procedures. The upper 12 inches of pavement subgrade should be moisture conditioned to at, or above optimum moisture content.

### 6.5.3 Moisture Considerations

The pavement design should consider both the vehicular loading, as well as the environmental factors. The vehicular loading will depend on the amount and type of traffic anticipated for the pavement design life. Environmental factors include the potential for moisture variations beneath the pavement structural section. It is recommended that all pavement areas conform to the following criteria:

- All trench backfill should be properly placed and adequately compacted to provide a stable subgrade.
- Adequate drainage should be provided to prevent ponding of surface water which could saturate the subgrade soil.

- A periodic maintenance program should be incorporated to include sealing cracks and other measures.
- Any concrete curbs and gutters should extend to the subgrade.

#### 6.5.4 Construction Considerations

In the event unstable (pumping) subgrades are encountered within planned pavement areas, it is recommended a heavy, rubber-tired vehicle (typically a loaded water truck) be used to test the load/deflection characteristics of the finished subgrade materials. It is recommended this vehicle have a minimum rear axle load (at the time of testing) of 16,000 pounds with tires inflated to at least 65 psi pressure. If the tested surface shows a visible deflection extending more than 6 inches from the wheel track at the time of loading, or a visible crack remains after loading, corrective measures should be implemented. Such measures could include disking to aerate, chemical treatment, replacement with drier material, or other methods. It is recommended Kleinfelder be retained to assist in developing which method (or methods) would be applicable for this project.

#### 6.5.5 Construction Observation and Testing

It is recommended that all earthwork during construction be monitored by a representative from Kleinfelder, including site preparation, placement of all engineered fill and trench backfill, construction of slab and pavement subgrades. The purpose of these services would be to provide Kleinfelder the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

### 6.6 CORROSION POTENTIAL

Kleinfelder has completed laboratory testing to provide data regarding corrosivity of onsite soils. Our scope of services does not include corrosion engineering and, therefore, a detailed analysis of the corrosion test results is not included in this report. A qualified corrosion engineer should be retained to review the test results and design protective systems that may be required. Kleinfelder may be able to provide those services.



Laboratory chloride concentration, sulfate concentration, pH, and electrical resistivity tests were performed on near-surface composite soil samples from the upper 3 feet of Boring B-6 and B-7. The results of the tests are summarized in Table 6.6-1. If fill materials will be imported to the project site, similar corrosion potential laboratory testing should be completed on the imported material.

**Table 6.6-1**  
**Soil Corrosion Potential Laboratory Test Results**

| Boring | Depth, Feet | Material   | Minimum Resistivity, ohm-cm | pH   | Water-Soluble Ion Concentration, ppm |         |
|--------|-------------|------------|-----------------------------|------|--------------------------------------|---------|
|        |             |            |                             |      | Chloride                             | Sulfate |
| B-6    | 0 to 3      | Silty Sand | 24,900                      | 7.32 | 3.9                                  | 0.2     |
| B-7    | 0 to 3      | Sandy Silt | 17,400                      | 7.77 | 30.7                                 | 37.5    |

The following summary is provided with respect to the results presented in Table 6.7-1 and applicable references. Not that the 2019 CBC refers to ACI 318, Section 4.2, for corrosion exposure potential for concrete in contact with soils.

- The measured saturated minimum resistivity values indicates the soil is “moderately corrosive” to buried ferrous metals. These correlations are based on Corrosion Basics, 2<sup>nd</sup> edition, Roberge, 2006.
- A water-soluble chloride content of less than 500 ppm is generally considered non-corrosive to reinforced concrete. The samples tested had 3.9 and 30.7 ppm soluble Chloride contents. According to the American Concrete Institute (ACI) 318-08, Table 4.2.1, the Exposure Severity and Class for corrosion protection of reinforcement are “Not Applicable” and “C0” if the concrete is dry or protected from moisture, and “Moderate” and “C1” if the concrete is exposed to moisture but not to external sources of chlorides. For both classes, concrete should have a minimum compressive strength of 2,500 psi and there is no restriction on the maximum water cement ratio used. If concrete is exposed to moisture and an external source of chlorides, the Exposure Severity and Class for corrosion protection of reinforcement are “Severe” and “C2”. For C2 or Severe conditions concrete should have a minimum compressive strength of 5,000 psi and a maximum water cement ratio of 0.40.

- According to the American Concrete Institute (ACI) 318-08, Table 4.2.1, the Exposure Severity is “not applicable” and the Exposure Class is “S0” for soils with a water soluble sulfate content of less than 1,000 ppm. According to Table 4.3.1 of ACI 318-08, for an Exposure Class of “S0”, there is no specification for maximum water cement ratio, and concrete should have a minimum compressive strength of 2,500 psi.

The provided preliminary corrosion tests are only an indicator of potential soil corrosivity for the sample tested. Kleinfelder’s scope of work did not include corrosion engineering. If more detailed information is required, it is recommended a competent corrosion engineer be retained to evaluate the corrosion potential of the site to proposed improvements, to recommend further testing as required, and to provide specific corrosion mitigation methods appropriate for the project.

## 6.7 SITE DRAINAGE

### 6.7.1 General

It is important that drainage away from the improvements be provided to prevent ponding and/or saturation of the soils in the vicinity of foundations, concrete slabs-on-grade, or pavements. Poor surface drainage could cause reduced subgrade support. The site should be graded to carry surface water away from the improvements and convey it to proper discharge points. Proper drainage needs to be a partnering between design and maintenance of the facility.

The development should incorporate the basis for good drainage. This includes:

- Sufficient pad height to allow for proper drainage.
- Defined drainage gradients away from the structures to points of conveyance, such as drainage swales and/or area drains and discharge pipe.
- Roof downspouts connected to proper areas of discharge.

The maintenance personnel must maintain the established drainage by not blocking or obstructing gradients away from structures without providing some alternative drainage means (e.g. area drains and subsurface pipes). If planter areas are established near the structures, it is important to prevent surface run-off from entering the planter. Where planted areas are adjacent to the structures, care must be taken not to over irrigate and to maintain a leak-free sprinkler piping

system. Consideration should be given to use of low volume emitter irrigation systems for planters. Well-maintained low-volume emitter irrigation (drip system) is best suited for planters adjacent to structures. Watering practices must strive to use only sufficient water to sustain and promote plant growth.

#### 6.7.2 On-Site Infiltration Basin

The proposed infiltration basin to be located on the east end of the site may be a source of moisture infiltration that could trigger hydrocompaction of the foundation soils and subsequent settlement. As such, if the hydrocompactive soils are to remain without recompaction to minimize post construction settlement due to hydrocompaction, then it is recommended that the pond design incorporate dry wells to direct and infiltrate storm water at a depth below 10 feet from the existing site grade.

## 7 ADDITIONAL SERVICES

---

### 7.1 ADDITIONAL ENGINEERING INVESTIGATIONS

As the planning evolves to conceptual and eventual design, detailed design-level Geotechnical Investigation Report(s) and additional soil borings should be conducted that are site specific and address the loading conditions and development schemes for the final designs.

### 7.2 PLANS AND SPECIFICATIONS REVIEW

It is recommended Kleinfelder conduct a general review of plans and specifications to evaluate that the earthwork and foundation recommendations have been properly interpreted and implemented during design. In the event Kleinfelder is not retained to perform this recommended review, no responsibility will be assumed for misinterpretation of the recommendations.

### 7.3 CONSTRUCTION OBSERVATION AND TESTING

It is recommended that all earthwork during construction be monitored by a representative from Kleinfelder, including site preparation, placement of all engineered fill and trench backfill, construction of slab and pavement subgrades, and all foundation excavations. The purpose of these services would be to provide Kleinfelder the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

## 8 LIMITATIONS

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Recommendations contained in this report are based on the field observations and subsurface explorations, laboratory tests, and present knowledge of the proposed construction. It is possible that soil conditions could vary between or beyond the points explored. If soil conditions are encountered during construction that differ from those described herein, Kleinfelder should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction changes from that described in this report, the recommendations provided should also be reviewed.

This report has been prepared in substantial accordance with the generally accepted geotechnical engineering practice, as it exists in the general area at the time of the study. No warranty or guarantee, express or implied, is intended or provided. The recommendations provided in this report are based on the assumption that Kleinfelder will conduct an adequate program of tests and observations during the construction phase in order to evaluate compliance with the recommendations.

This report may be used only by the Epic Management Group, Inc. and their designated representatives for the purposes stated, within a reasonable time from its issuance, but in no event later than one year (without review) from the date of the report. Land use, site conditions or other factors may change over time, and additional work may be required with the passage of time. Any other party who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.



## 9 REFERENCES

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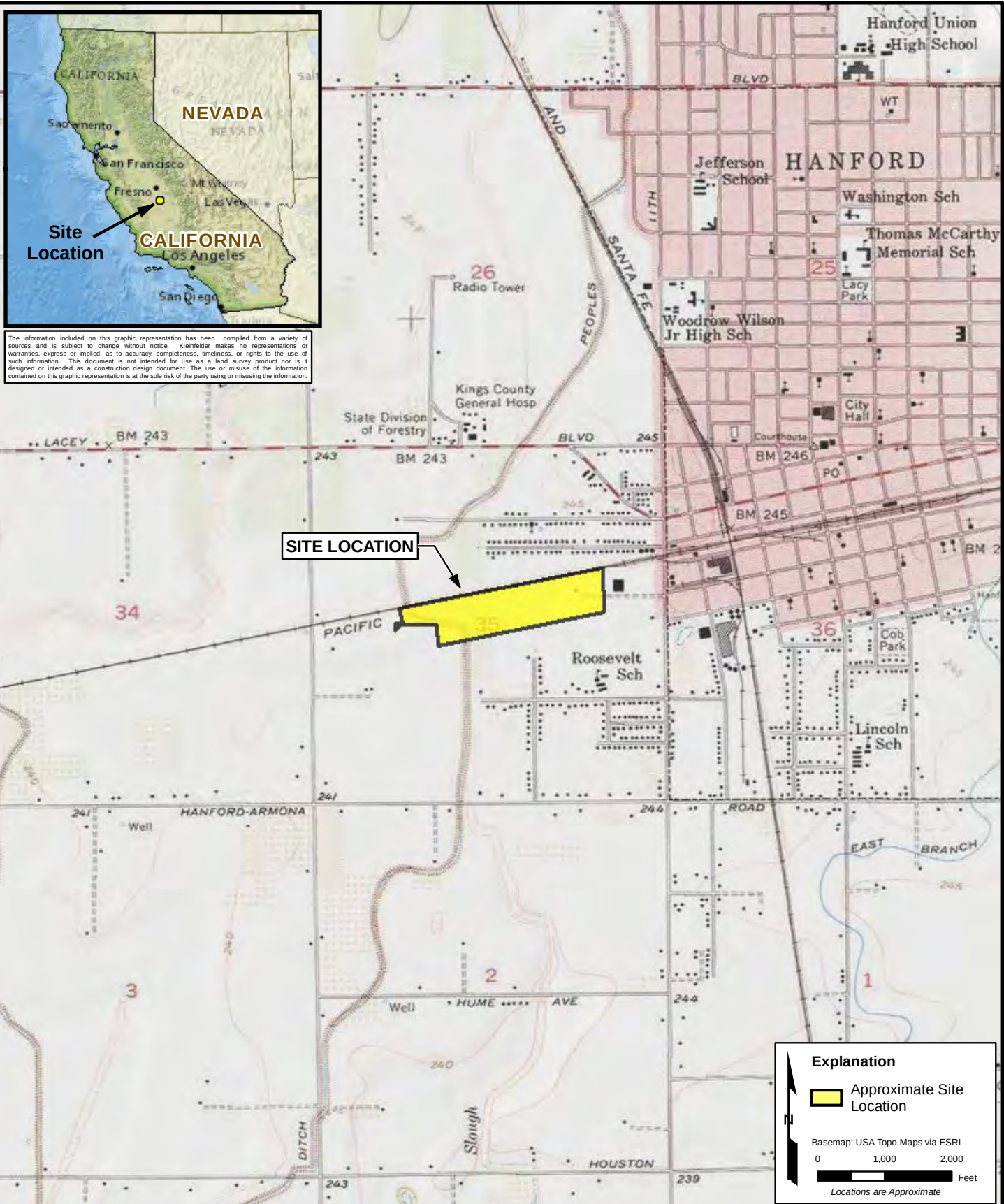
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## FIGURES

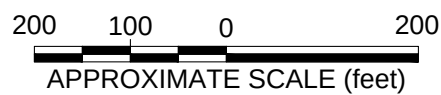
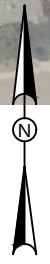
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|                                              |    |
|----------------------------------------------|----|
| Site Vicinity Map                            | 1  |
| Exploration Location Map                     | 2  |
| Site Plan and Geology Map                    | 3  |
| Area Geology Map                             | 4  |
| Regional Geology Map                         | 5  |
| Cross Section A-A'                           | 6  |
| Cross Section B-B'                           | 7  |
| Regional Fault Map and Earthquake Epicenters | 8  |
| FEMA Flood Map                               | 9  |
| Dan Inundation Map                           | 10 |



|                                                                                     |             |              |                                                                               |                 |
|-------------------------------------------------------------------------------------|-------------|--------------|-------------------------------------------------------------------------------|-----------------|
|  | PROJECT:    | 20210045     | SITE VICINITY MAP                                                             | FIGURE<br><br>1 |
|                                                                                     | DRAWN:      | JUNE 2020    |                                                                               |                 |
|                                                                                     | DRAWN BY:   | RA           | PROPOSED HANFORD PLACE<br>MEDICAL & MIXED-USE PROPERTY<br>HANFORD, CALIFORNIA |                 |
|                                                                                     | CHECKED BY: | AA           |                                                                               |                 |
|                                                                                     | FILE NAME:  | Figure_1.mxd |                                                                               |                 |





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EXPLANATION

- B-9 APPROXIMATE BORING LOCATION
- R-7 APPROXIMATE R-VALUE LOCATION

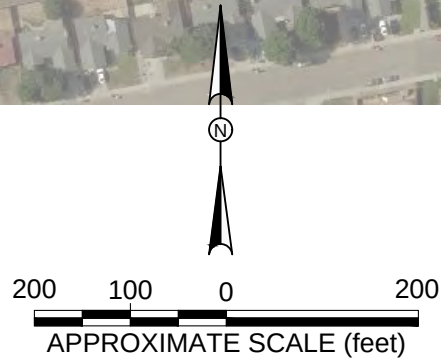
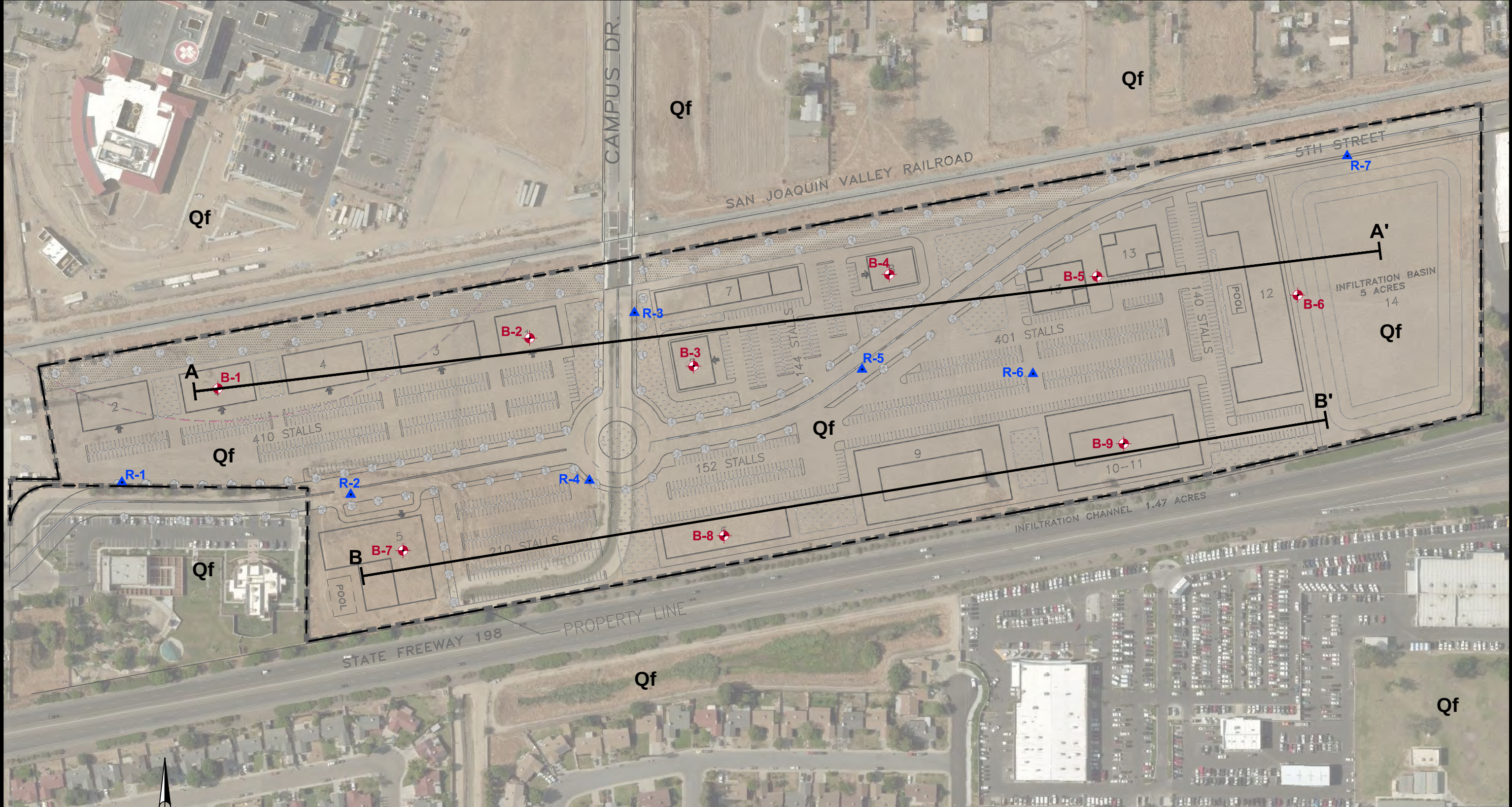
REFERENCE: BASE MAP PROVIDED BY ZUMWALT HANSEN, INC., DATED 09/24/19



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| REVISED:   | 05/2020  |

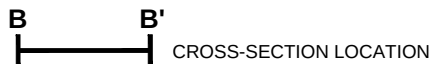
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|-------------------------------------------------------------------------------|-----------------|
| EXPLORATION LOCATION MAP                                                      | FIGURE<br><br>2 |
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EXPLANATION

- B-9 APPROXIMATE BORING LOCATION
- R-7 APPROXIMATE R-VALUE LOCATION



GEOLOGIC UNITS

Qf FAN DEPOSITS

REFERENCE: BASE MAP PROVIDED BY ZUMWALT HANSEN, INC., DATED 09/24/19

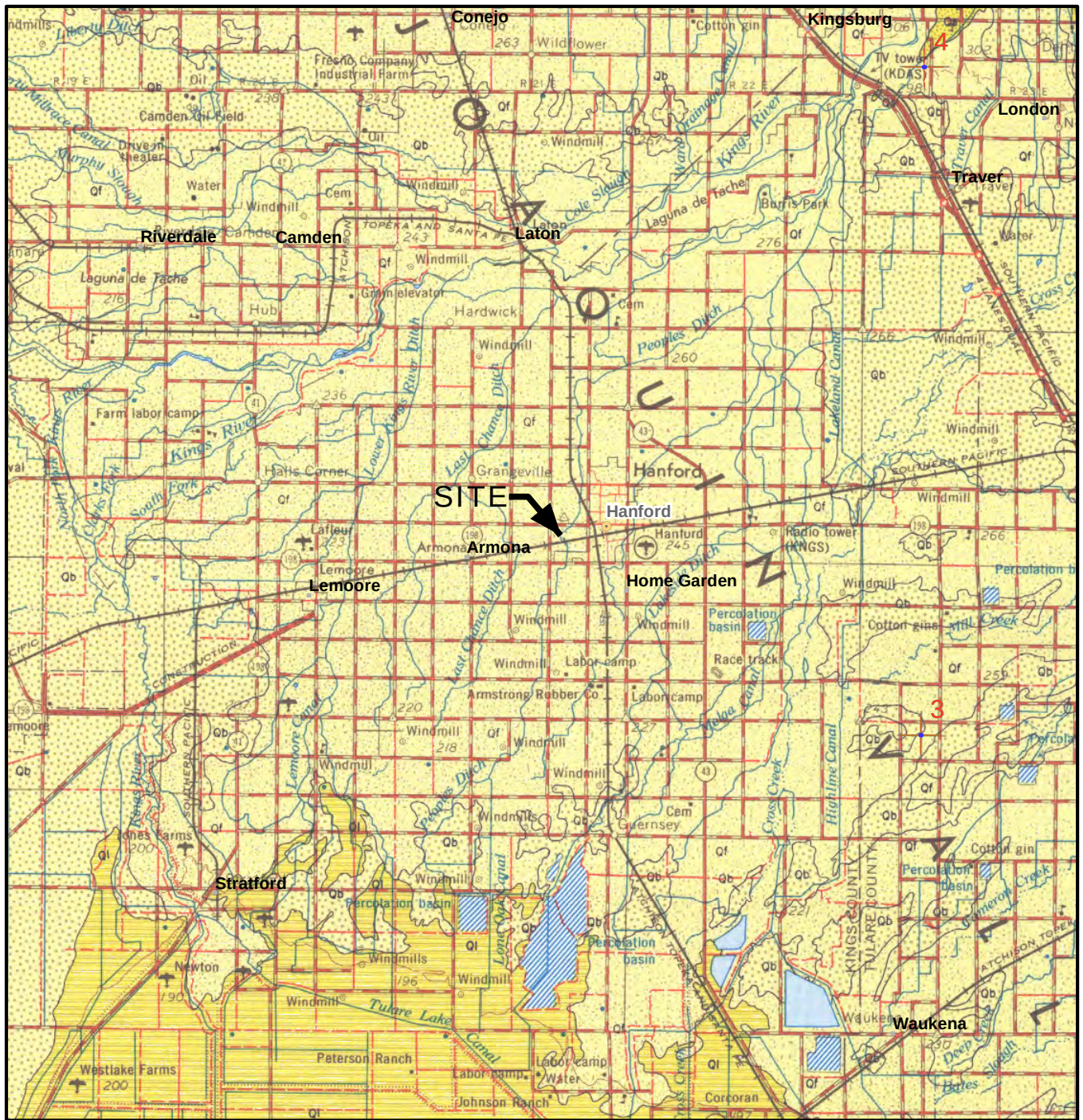


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| SITE PLAN AND GEOLOGY MAP                                                     | FIGURE |
|-------------------------------------------------------------------------------|--------|
| PROPOSED HANFORD PLACE<br>MEDICAL & MIXED-USE PROPERTY<br>HANFORD, CALIFORNIA | 3      |

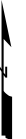
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- Qf Fan deposits
- Qb Basin deposits
- Ql Quaternary lake deposits

0 1 2 4  
Miles



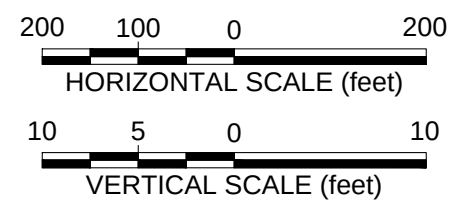
**REFERENCE:**  
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Fresno sheet, California Division of Mines and Geology, 1965, 1:250,000.

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|  <div><b>KLEINFELDER</b><br/><i>Bright People. Right Solutions.</i><br/>www.kleinfelder.com</div> | PROJECT NO. 20210045       | <b>AREA GEOLOGY MAP</b>                                                       | FIGURE<br><br>4 |
|                                                                                                                                                                                      | DRAWN: JUNE 2020           |                                                                               |                 |
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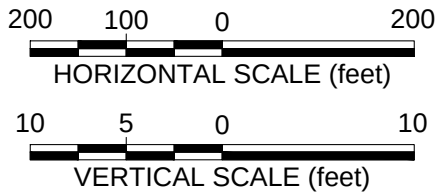
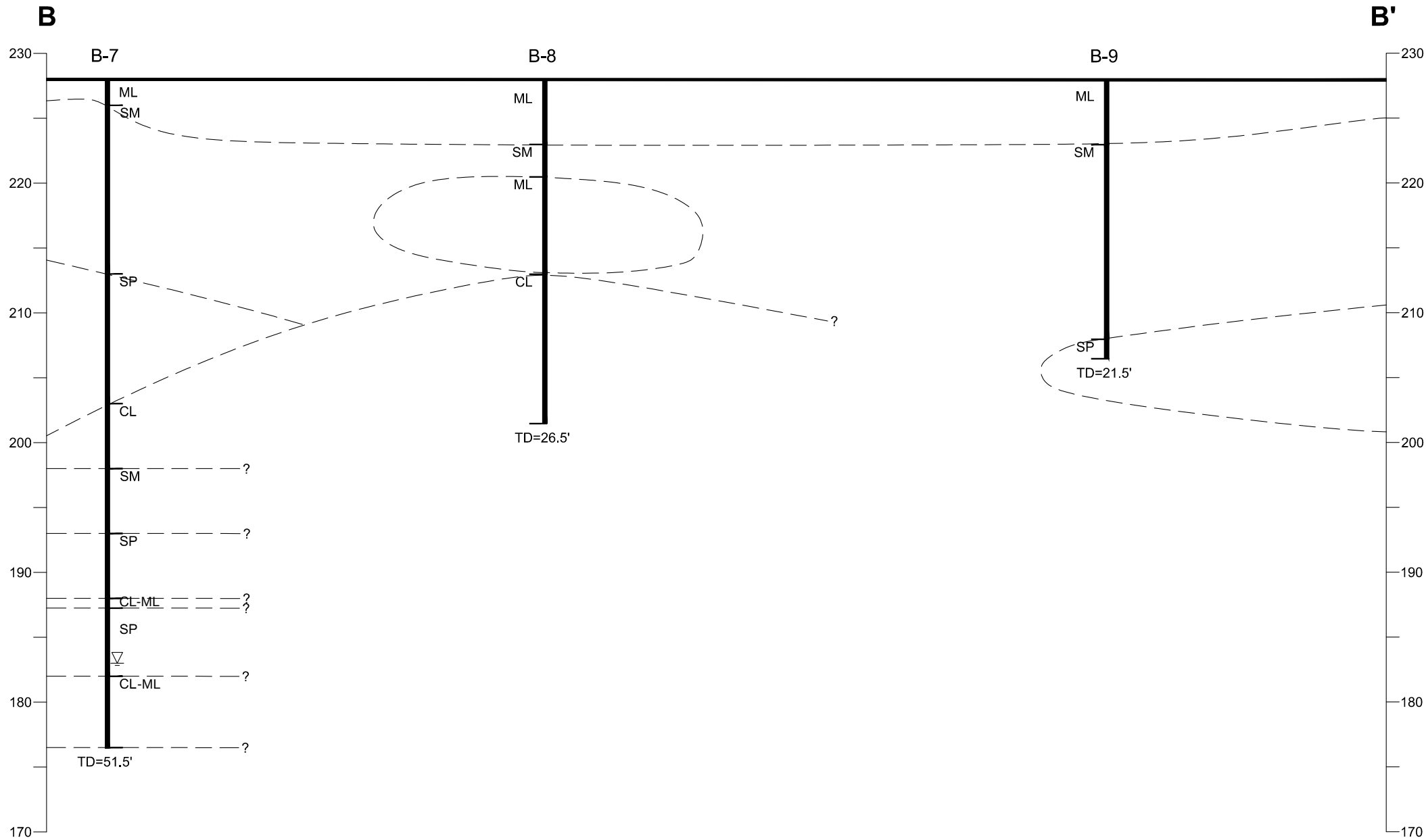


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6





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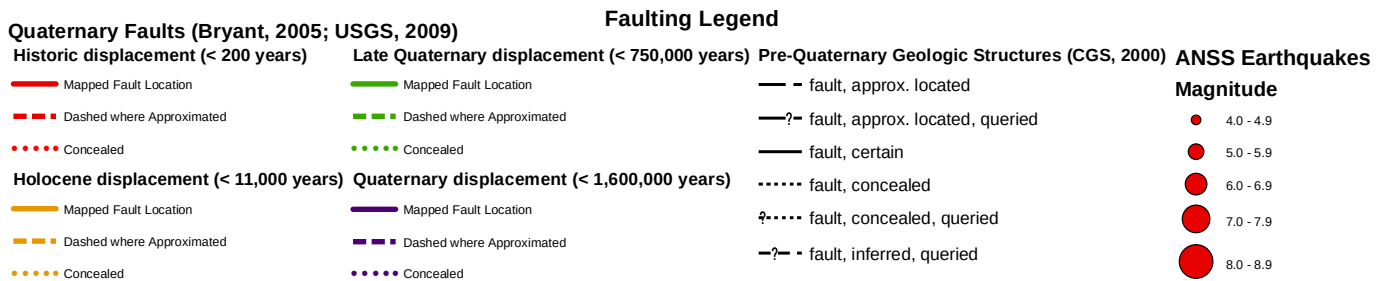
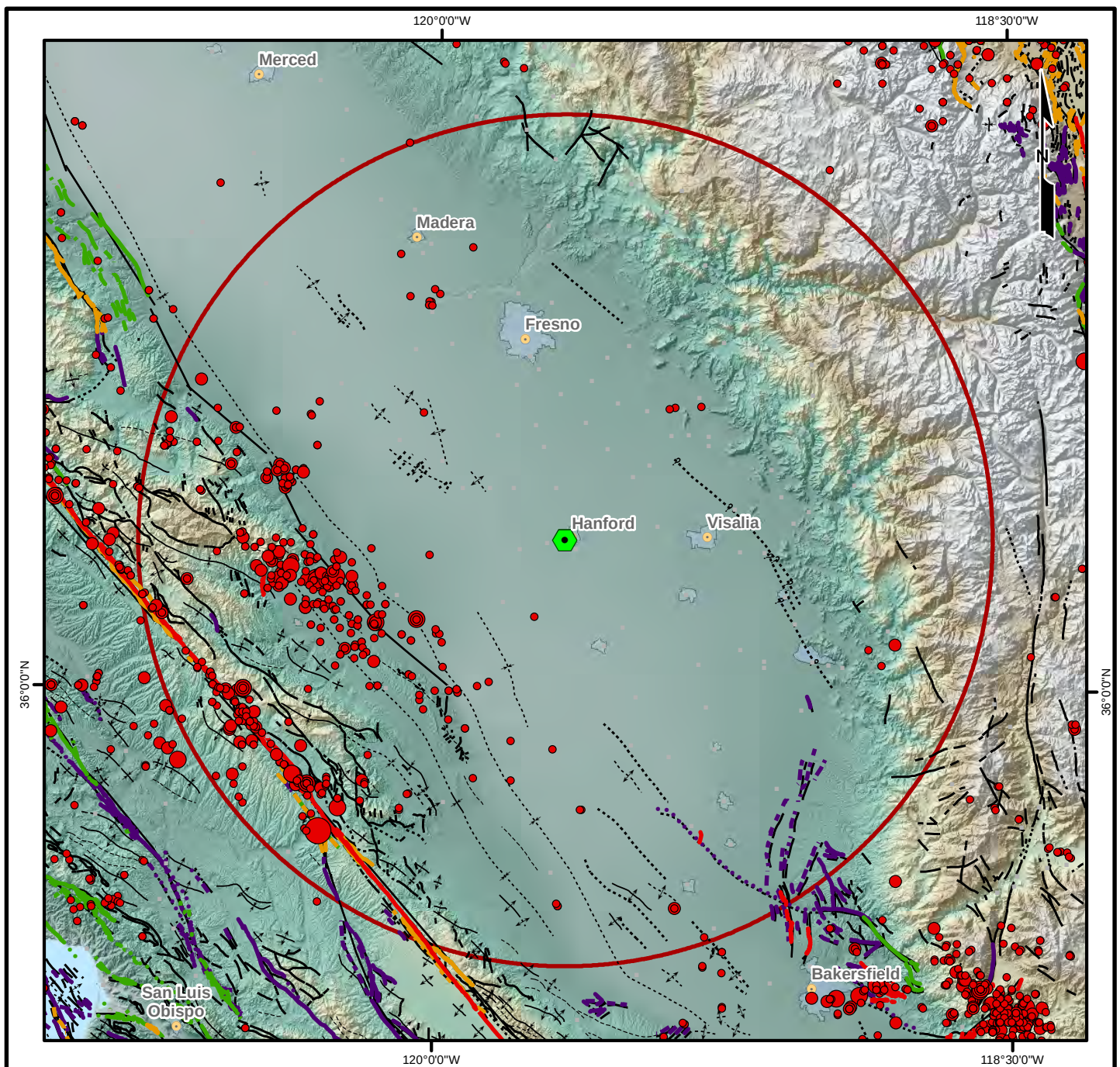
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DATE: 06/2020  
REVISED: 06/2020

CROSS-SECTION B-B'

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FIGURE

7



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| <br><b>KLEINFELDER</b><br><i>Bright People. Right Solutions.</i><br>www.kleinfelder.com | PROJECT NO. | 20210045     | <b>REGIONAL FAULT MAP<br/>AND EARTHQUAKE EPICENTERS<br/>(1800 - MAY 2020)</b> | FIGURE<br><br><b>8</b> |
|                                                                                                                                                                            | DRAWN:      | JUNE 2020    |                                                                               |                        |
|                                                                                                                                                                            | DRAWN BY:   | RA           |                                                                               |                        |
|                                                                                                                                                                            | CHECKED BY: | AA           |                                                                               |                        |
|                                                                                                                                                                            | FILE NAME:  | Figure_8.mxd | PROPOSED HANFORD PLACE<br>MEDICAL & MIXED-USE PROPERTY<br>HANFORD, CALIFORNIA |                        |



## LEGEND

### SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

### FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

### OTHER FLOOD AREAS

- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

### OTHER AREAS

- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.

### COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

### OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D Boundary
- CBRS and OPA Boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 Base Flood Elevation line and value; elevation in feet\* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet\*

\*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

1000-meter Universal Transverse Mercator grid values, zone 10 and 11

5000-foot grid ticks: California State Plane coordinate system, zone IV (FIPSZONE 0404), Lambert Conformal Conic Projection

Bench mark (see explanation in Notes to Users section of this FIRM panel)

• M1.5 River Mile

### MAP REPOSITORIES

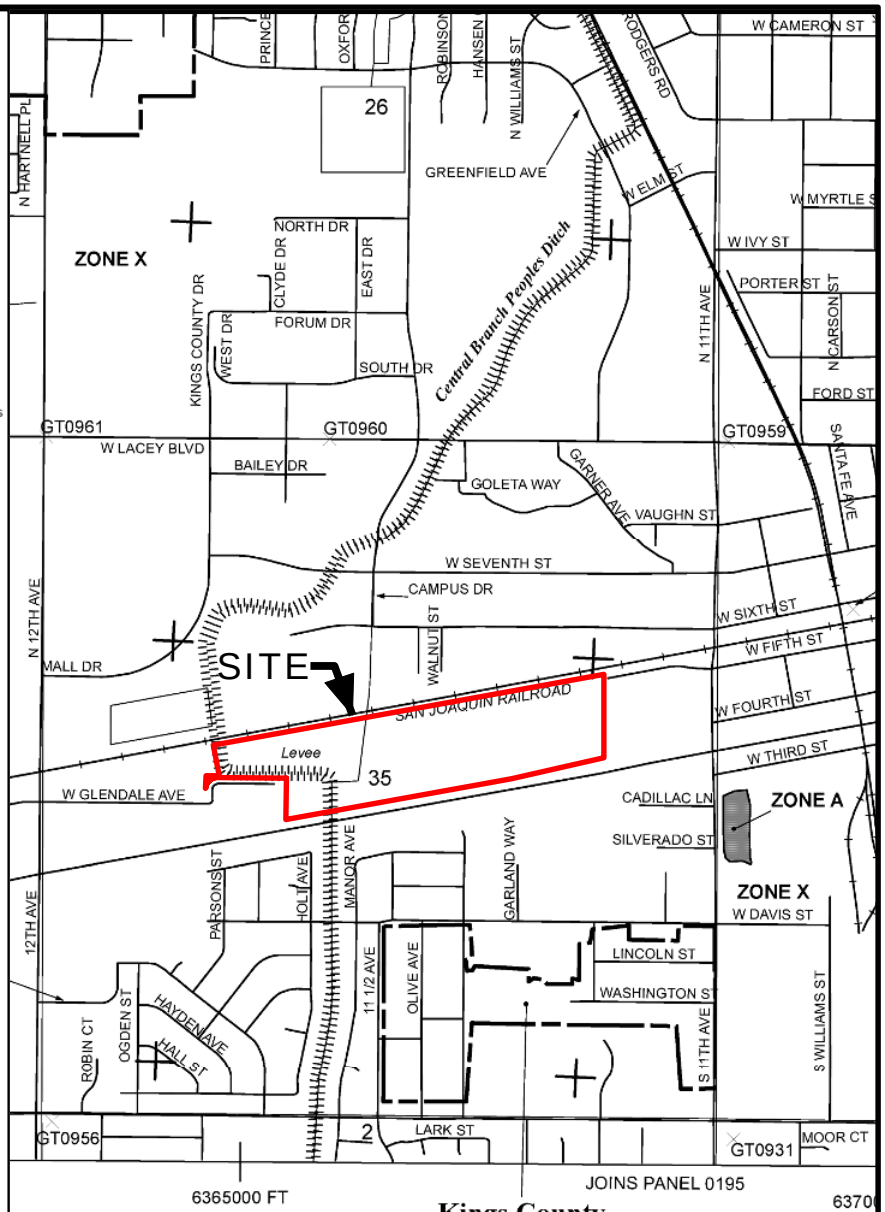
Refer to Map Repositories list on Map Index.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP PANEL  
JUNE 16, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



0 1,500 3,000 Feet

### REFERENCE:

FEMA Flood Insurance Rate map, Kings County, California, Map # 06031C0185C, dated 2009

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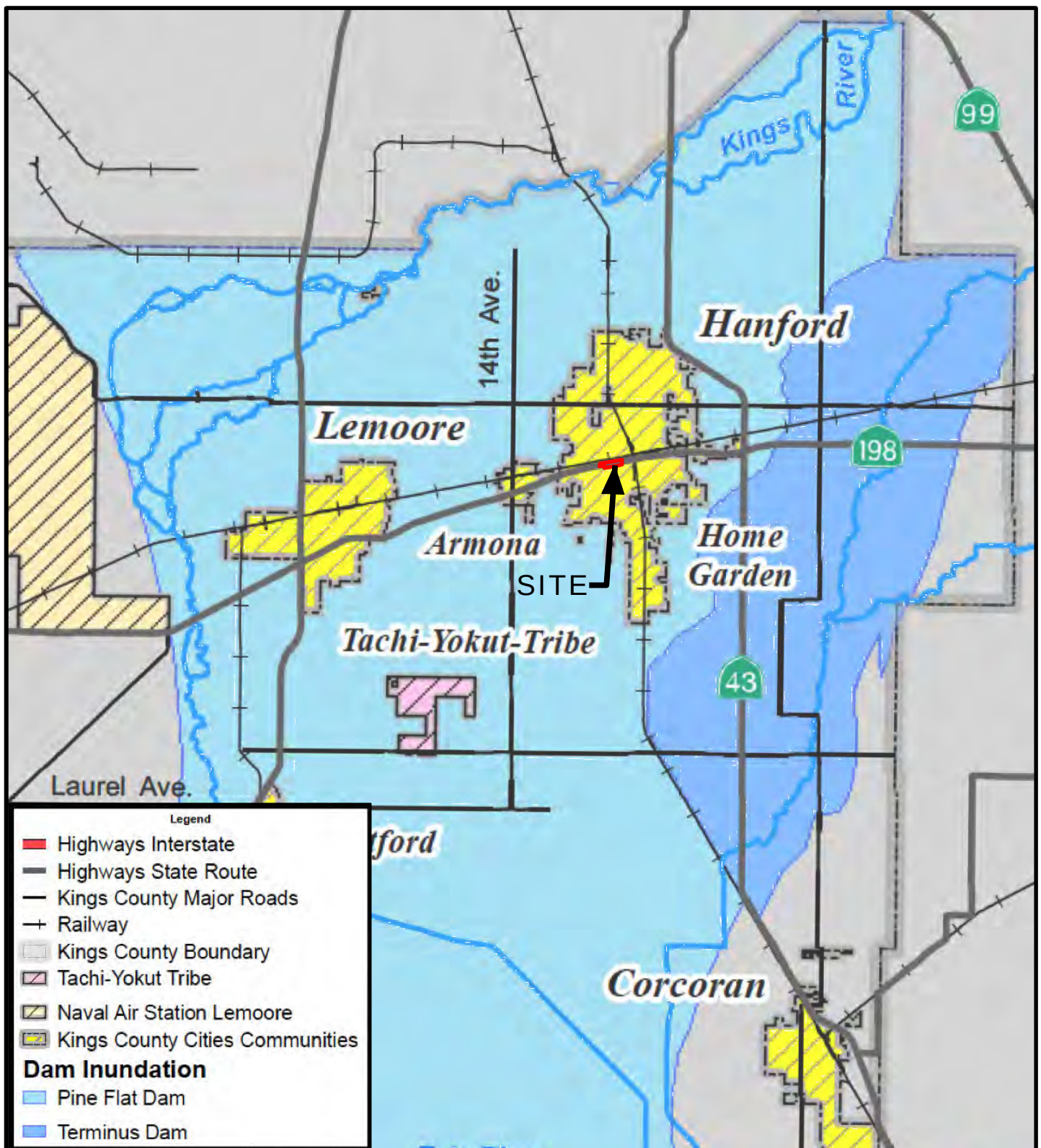
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CHECKED BY: AA  
FILE NAME: Figure\_9.mxd

### FEMA FLOOD MAP

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

FIGURE

9



REFERENCE:  
Kings County Multi-jurisdictional Local  
Hazard Mitigation Plan, December 2012

0 2 4  
Miles

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## DAM INUNDATION MAP

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

FIGURE

10

## APPENDIX A

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|                      |          |
|----------------------|----------|
| Graphics Key         | A-1      |
| Soil Description Key | A-2      |
| Boring Logs          | A-3/A-11 |



## SAMPLE/SAMPLER TYPE GRAPHICS



BULK SAMPLE

CALIFORNIA SAMPLER  
(3 in. (76.2 mm.) outer diameter)

STANDARD PENETRATION SPLIT SPOON SAMPLER  
(2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

## GROUND WATER GRAPHICS

- WATER LEVEL (level where first observed)
- WATER LEVEL (level after exploration completion)
- WATER LEVEL (additional levels after exploration)
- OBSERVED SEEPAGE

## NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, i.e., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

## ABBREVIATIONS

WOH - Weight of Hammer  
WOR - Weight of Rod

## UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

| GRAVELS<br>(More than half of coarse fraction is larger than the #200 sieve)    | CLEAN GRAVEL WITH <5% FINES                  | Cu ≥ 4 and 1 ≤ Cc ≤ 3    | GW    | WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES                                 |
|---------------------------------------------------------------------------------|----------------------------------------------|--------------------------|-------|---------------------------------------------------------------------------------------------------|
|                                                                                 |                                              |                          |       |                                                                                                   |
| GRAVELS WITH 5% TO 12% FINES                                                    | Cu ≥ 4 and 1 ≤ Cc ≤ 3                        | GW-GM                    | GP    | POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES                               |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 | Cu < 4 and/or 1 > Cc > 3                     | GW-GC                    | GP-GM | WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES                                  |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              | GP-GC                    | GM    | POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES                                     |
|                                                                                 |                                              |                          |       |                                                                                                   |
| GRAVELS WITH > 12% FINES                                                        |                                              | GC                       | GC-GM | POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES                                |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
| SANDS<br>(Half or more of coarse fraction is smaller than the #4 sieve)         | CLEAN SANDS WITH <5% FINES                   | Cu ≥ 6 and 1 ≤ Cc ≤ 3    | SW    | WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 | SANDS WITH 5% TO 12% FINES                   | Cu ≥ 6 and 1 ≤ Cc ≤ 3    | SP    | POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES                                 |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              | Cu < 6 and/or 1 > Cc > 3 | SW-SM | WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES                                    |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 | SANDS WITH > 12% FINES                       |                          | SM    | WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES                                    |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
| FINE GRAINED SOILS<br>(Half or more of material is smaller than the #200 sieve) | SILTS AND CLAYS (Liquid Limit less than 50)  |                          | ML    | INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY     |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 | SILTS AND CLAYS (Liquid Limit 50 or greater) |                          | CL    | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |
|                                                                                 |                                              |                          |       |                                                                                                   |

NOTE: USE MATERIAL DESCRIPTION ON THE LOG TO DEFINE A GRAPHIC THAT MAY NOT BE PROVIDED ON THIS LEGEND.



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DATE:

## GRAPHICS KEY

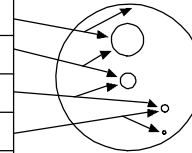
PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

A-1

## GRAIN SIZE

| DESCRIPTION | SIEVE SIZE                            | GRAIN SIZE                           | APPROXIMATE SIZE               |
|-------------|---------------------------------------|--------------------------------------|--------------------------------|
| Boulders    | >12 in. (304.8 mm.)                   | >12 in. (304.8 mm.)                  | Larger than basketball-sized   |
| Cobbles     | 3 - 12 in. (76.2 - 304.8 mm.)         | 3 - 12 in. (76.2 - 304.8 mm.)        | Fist-sized to basketball-sized |
| Gravel      | coarse<br>3/4 - 3 in. (19 - 76.2 mm.) | 3/4 - 3 in. (19 - 76.2 mm.)          | Thumb-sized to fist-sized      |
|             | fine<br>#4 - 3/4 in. (#4 - 19 mm.)    | 0.19 - 0.75 in. (4.8 - 19 mm.)       | Pea-sized to thumb-sized       |
| Sand        | coarse<br>#10 - #4                    | 0.075 - 0.19 in. (2 - 4.9 mm.)       | Rock salt-sized to pea-sized   |
|             | medium<br>#40 - #10                   | 0.017 - 0.075 in. (0.43 - 2 mm.)     | Sugar-sized to rock salt-sized |
|             | fine<br>#200 - #40                    | 0.0029 - 0.017 in. (0.07 - 0.43 mm.) | Flour-sized to sugar-sized     |
| Fines       | Passing #200                          | <0.0029 in. (<0.07 mm.)              | Flour-sized and smaller        |



## SECONDARY CONSTITUENT

|             | AMOUNT                                |                                         |
|-------------|---------------------------------------|-----------------------------------------|
| Term of Use | Secondary Constituent is Fine Grained | Secondary Constituent is Coarse Grained |
| Trace       | <5%                                   | <15%                                    |
| With        | ≥5 to <15%                            | ≥15 to <30%                             |
| Modifier    | ≥15%                                  | ≥30%                                    |

## MOISTURE CONTENT

| DESCRIPTION | FIELD TEST                                            |
|-------------|-------------------------------------------------------|
| Dry         | Absence of moisture, dusty, dry to the touch          |
| Moist       | Damp but no visible water                             |
| Wet         | Visible free water, usually soil is below water table |

## CEMENTATION

| DESCRIPTION | FIELD TEST                                                 |
|-------------|------------------------------------------------------------|
| Weakly      | Crumbles or breaks with handling or slight finger pressure |
| Moderately  | Crumbles or breaks with considerable finger pressure       |
| Strongly    | Will not crumble or break with finger pressure             |

## CONSISTENCY - FINE-GRAINED SOIL

| CONSISTENCY  | SPT - N <sub>60</sub> (# blows / ft) | Pocket Pen (tsf) | UNCONFINED COMPRESSIVE STRENGTH (Q <sub>u</sub> )(psf) | VISUAL / MANUAL CRITERIA                                                               |
|--------------|--------------------------------------|------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------|
| Very Soft    | <2                                   | PP < 0.25        | <500                                                   | Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed. |
| Soft         | 2 - 4                                | 0.25 ≤ PP < 0.5  | 500 - 1000                                             | Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.     |
| Medium Stiff | 4 - 8                                | 0.5 ≤ PP < 1     | 1000 - 2000                                            | Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.   |
| Stiff        | 8 - 15                               | 1 ≤ PP < 2       | 2000 - 4000                                            | Can be imprinted with considerable pressure from thumb.                                |
| Very Stiff   | 15 - 30                              | 2 ≤ PP < 4       | 4000 - 8000                                            | Thumb will not indent soil but readily indented with thumbnail.                        |
| Hard         | >30                                  | 4 ≤ PP           | >8000                                                  | Thumbnail will not indent soil.                                                        |

## REACTION WITH HYDROCHLORIC ACID

| DESCRIPTION | FIELD TEST                                         |
|-------------|----------------------------------------------------|
| None        | No visible reaction                                |
| Weak        | Some reaction, with bubbles forming slowly         |
| Strong      | Violent reaction, with bubbles forming immediately |

## APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

| APPARENT DENSITY | SPT-N <sub>60</sub> (# blows/ft) | MODIFIED CA SAMPLER (# blows/ft) | CALIFORNIA SAMPLER (# blows/ft) | RELATIVE DENSITY (%) |
|------------------|----------------------------------|----------------------------------|---------------------------------|----------------------|
| Very Loose       | <4                               | <4                               | <5                              | 0 - 15               |
| Loose            | 4 - 10                           | 5 - 12                           | 5 - 15                          | 15 - 35              |
| Medium Dense     | 10 - 30                          | 12 - 35                          | 15 - 40                         | 35 - 65              |
| Dense            | 30 - 50                          | 35 - 60                          | 40 - 70                         | 65 - 85              |
| Very Dense       | >50                              | >60                              | >70                             | 85 - 100             |

FROM TERZAGHI AND PECK, 1948

## PLASTICITY

| DESCRIPTION | LL      | PI      |
|-------------|---------|---------|
| Non-Plastic | NP      | NP      |
| Low         | < 30    | < 15    |
| Medium      | 30 - 50 | 15 - 25 |
| High        | > 50    | > 25    |

LL is from Casagrande, 1948. PI is from Holtz, 1959.

## STRUCTURE

| DESCRIPTION  | CRITERIA                                                                                                                      |
|--------------|-------------------------------------------------------------------------------------------------------------------------------|
| Stratified   | Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.                           |
| Laminated    | Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.                       |
| Fissured     | Breaks along definite planes of fracture with little resistance to fracturing.                                                |
| Slickensided | Fracture planes appear polished or glossy, sometimes striated.                                                                |
| Blocky       | Cohesive soil that can be broken down into small angular lumps which resist further breakdown.                                |
| Lensed       | Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness. |

## ANGULARITY

| DESCRIPTION | CRITERIA                                                                        |
|-------------|---------------------------------------------------------------------------------|
| Angular     | Particles have sharp edges and relatively plane sides with unpolished surfaces. |
| Subangular  | Particles are similar to angular description but have rounded edges.            |
| Subrounded  | Particles have nearly plane sides but have well-rounded corners and edges.      |
| Rounded     | Particles have smoothly curved sides and no edges.                              |



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## SOIL DESCRIPTION KEY

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HANFORD, CALIFORNIA

APPENDIX

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|                                                  |                                           |                       |
|--------------------------------------------------|-------------------------------------------|-----------------------|
| <b>Date Begin - End:</b> 4/20/2020               | <b>Drilling Company:</b> Moore Twining    | <b>BORING LOG B-1</b> |
| <b>Logged By:</b> J. Green                       | <b>Drill Crew:</b>                        |                       |
| <b>Hor.-Vert. Datum:</b> Not Available           | <b>Drilling Equipment:</b> CME-75         |                       |
| <b>Plunge:</b> -90 degrees                       | <b>Drilling Method:</b> Hollow Stem Auger |                       |
| <b>Weather:</b> Not Available                    | <b>Auger Diameter:</b> 8 in. O.D.         |                       |
| <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |                                           |                       |
| <b>Hammer Efficiency:</b> 86.4%                  |                                           |                       |
| <b>Hammer Cal. Date:</b> 5/14/2019               |                                           |                       |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                          |             |                                                                |                              | LABORATORY RESULTS    |                      |                    |                |                  |              |                                     |                              |
|--------------|---------------|----------------------------------------------------------------------------|-------------|----------------------------------------------------------------|------------------------------|-----------------------|----------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|
|              |               | Surface Condition: Grass & Weeds                                           | Sample Type | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%) | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks |
|              |               | Lithologic Description                                                     |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |
|              |               | <b>Silty SAND (SM):</b> medium dense, brown, moist, fine to medium-grained |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |

|                                                                                     |                                                  |                |          |
|-------------------------------------------------------------------------------------|--------------------------------------------------|----------------|----------|
|  | PROJECT NO.: 20210045.001A                       | BORING LOG B-1 | APPENDIX |
|                                                                                     | DRAWN BY: AA<br>CHECKED BY: ES<br>DATE: 6/4/2020 |                |          |
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|                          |               |                            |                   |                                                  |
|--------------------------|---------------|----------------------------|-------------------|--------------------------------------------------|
| <b>Date Begin - End:</b> | 4/20/2020     | <b>Drilling Company:</b>   | Moore Twining     | <b>BORING LOG B-2</b>                            |
| <b>Logged By:</b>        | J. Green      | <b>Drill Crew:</b>         |                   |                                                  |
| <b>Hor.-Vert. Datum:</b> | Not Available | <b>Drilling Equipment:</b> | CME-75            | <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |
| <b>Plunge:</b>           | -90 degrees   | <b>Drilling Method:</b>    | Hollow Stem Auger | <b>Hammer Efficiency:</b> 86.4%                  |
| <b>Weather:</b>          | Not Available | <b>Auger Diameter:</b>     | 8 in. O.D.        | <b>Hammer Cal. Date:</b> 5/14/2019               |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                                                          |             |                                                                |                              |                       | LABORATORY RESULTS                                                                                                    |                    |                |                  |              |                                     |                              |
|--------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------|------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                                                           | Sample Type | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%)                                                                                                  | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks |
|              |               | Lithologic Description                                                                                                                     |             |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
|              |               | <b>Sandy SILT (ML):</b> medium stiff, light brown, moist, low plasticity                                                                   |             | BC=6<br>6<br>9                                                 |                              | 22                    |                                                                                                                       |                    |                | 60               |              |                                     |                              |
| 5            |               | hard                                                                                                                                       |             | BC=25<br>27<br>25                                              |                              | 75                    |                                                                                                                       |                    |                |                  |              |                                     |                              |
|              |               | <b>Silty SAND (SM):</b> medium dense, light brown, moist, fine-grained                                                                     |             | BC=6<br>7<br>8                                                 |                              | 22                    |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 10           |               |                                                                                                                                            |             | BC=8<br>10<br>11                                               |                              | 30                    | 6.5                                                                                                                   | 98.8               |                |                  |              |                                     |                              |
| 15           |               | <b>Poorly Graded SAND (SP):</b> medium dense, grayish brown, moist, fine-grained                                                           |             | BC=3<br>3<br>3                                                 |                              | 9                     |                                                                                                                       |                    |                |                  |              |                                     |                              |
|              |               | <b>Sandy Lean CLAY (CL):</b> medium stiff, dark brown, moist, low to medium plasticity                                                     |             |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 20           |               | <b>Poorly Graded SAND (SP):</b> medium dense, gray, moist, fine-grained                                                                    |             | BC=8<br>9<br>12                                                |                              | 30                    |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 25           |               | <b>Sandy SILT (ML):</b> medium stiff, gray, moist, non-plastic to low plasticity                                                           |             | BC=8<br>7<br>9                                                 |                              | 23                    |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 30           |               | The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 20, 2020. |             |                                                                |                              |                       | GROUNDWATER LEVEL INFORMATION:<br>Groundwater was not observed during drilling or after completion.<br>GENERAL NOTES: |                    |                |                  |              |                                     |                              |

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CHECKED BY: ES

DATE: 6/4/2020

## BORING LOG B-2

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
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|                                                  |                                           |                       |
|--------------------------------------------------|-------------------------------------------|-----------------------|
| <b>Date Begin - End:</b> 4/20/2020               | <b>Drilling Company:</b> Moore Twining    | <b>BORING LOG B-3</b> |
| <b>Logged By:</b> J. Green                       | <b>Drill Crew:</b>                        |                       |
| <b>Hor.-Vert. Datum:</b> Not Available           | <b>Drilling Equipment:</b> CME-75         |                       |
| <b>Plunge:</b> -90 degrees                       | <b>Drilling Method:</b> Hollow Stem Auger |                       |
| <b>Weather:</b> Not Available                    | <b>Auger Diameter:</b> 8 in. O.D.         |                       |
| <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |                                           |                       |
| <b>Hammer Efficiency:</b> 86.4%                  |                                           |                       |
| <b>Hammer Cal. Date:</b> 5/14/2019               |                                           |                       |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                                                          |                                                                                     |                                                                |                              |                       | LABORATORY RESULTS                                                                                                           |                    |                |                  |              |                                     |                                                                                                                            |
|--------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------|------------------|--------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                                                           | Sample Type                                                                         | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%)                                                                                                         | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks                                                                                               |
|              |               | Lithologic Description                                                                                                                     |                                                                                     |                                                                |                              |                       |                                                                                                                              |                    |                |                  |              |                                     |                                                                                                                            |
|              |               | <b>Silty SAND (SM):</b> medium dense, yellowish brown, moist, fine-grained, pinholes                                                       |    | BC=10<br>9<br>10                                               |                              | 27                    |                                                                                                                              |                    |                |                  |              |                                     | <b>Consolidation<br/>Direct Shear=</b><br>Peak Cohesion: 740 psf<br>Peak Friction Angle: 27.0°<br>Peak Tangent Angle: 0.52 |
| 5            |               |                                                                                                                                            |    | BC=8<br>12<br>13                                               |                              | 36                    | 3.2                                                                                                                          | 96.0               |                |                  |              |                                     |                                                                                                                            |
| 10           |               | light grayish brown                                                                                                                        |    | BC=10<br>11<br>13                                              |                              | 35                    |                                                                                                                              |                    |                |                  |              |                                     |                                                                                                                            |
| 15           |               | reddish brown                                                                                                                              |  | BC=7<br>8<br>10                                                |                              | 26                    |                                                                                                                              |                    |                |                  |              |                                     |                                                                                                                            |
| 20           |               | The boring was terminated at approximately 16.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 20, 2020. |                                                                                     |                                                                |                              |                       | GROUNDWATER LEVEL INFORMATION:<br>Groundwater was not observed during drilling or after completion.<br><u>GENERAL NOTES:</u> |                    |                |                  |              |                                     |                                                                                                                            |
| 25           |               |                                                                                                                                            |                                                                                     |                                                                |                              |                       |                                                                                                                              |                    |                |                  |              |                                     |                                                                                                                            |
| 30           |               |                                                                                                                                            |                                                                                     |                                                                |                              |                       |                                                                                                                              |                    |                |                  |              |                                     |                                                                                                                            |

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DATE: 6/4/2020

## BORING LOG B-3

 PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

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|                                        |                                           |                                                  |
|----------------------------------------|-------------------------------------------|--------------------------------------------------|
| <b>Date Begin - End:</b> 4/21/2020     | <b>Drilling Company:</b> Moore Twining    | <b>BORING LOG B-4</b>                            |
| <b>Logged By:</b> J. Green             | <b>Drill Crew:</b>                        |                                                  |
| <b>Hor.-Vert. Datum:</b> Not Available | <b>Drilling Equipment:</b> CME-75         | <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |
| <b>Plunge:</b> -90 degrees             | <b>Drilling Method:</b> Hollow Stem Auger | <b>Hammer Efficiency:</b> 86.4%                  |
| <b>Weather:</b> Not Available          | <b>Auger Diameter:</b> 8 in. O.D.         | <b>Hammer Cal. Date:</b> 5/14/2019               |

| Depth (feet) | Graphical Log                                                                      | FIELD EXPLORATION                                                                                                                          |                                                                                     |                                                                |                              | LABORATORY RESULTS                                                                                                                  |                      |                    |                |                  |              |                                     |                              |
|--------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|
|              |                                                                                    | Surface Condition: Grass & Weeds                                                                                                           | Sample Type                                                                         | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NP=No Recovery) | N <sub>60</sub> Value                                                                                                               | Water<br>Content (%) | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks |
|              |                                                                                    | Lithologic Description                                                                                                                     |                                                                                     |                                                                |                              |                                                                                                                                     |                      |                    |                |                  |              |                                     |                              |
|              |  | <b>Silty SAND (SM):</b> medium dense, light brown, moist, fine-grained, non-plastic, pinholes                                              |                                                                                     |                                                                |                              |                                                                                                                                     |                      |                    |                |                  |              |                                     |                              |
| 5            |                                                                                    |                                                                                                                                            |    | BC=10<br>14<br>15                                              |                              | 42                                                                                                                                  |                      |                    |                |                  |              |                                     |                              |
|              |                                                                                    |                                                                                                                                            |    | BC=6<br>9<br>14                                                |                              | 33                                                                                                                                  | 3.5                  | 95.5               |                |                  |              |                                     |                              |
| 10           |                                                                                    | dense, brown                                                                                                                               |    | BC=31<br>32<br>35                                              |                              | 96                                                                                                                                  |                      |                    |                |                  |              |                                     |                              |
| 15           |                                                                                    | medium dense, reddish brown                                                                                                                |  | BC=3<br>8<br>7                                                 |                              | 22                                                                                                                                  |                      |                    |                |                  |              |                                     |                              |
| 20           |                                                                                    | The boring was terminated at approximately 16.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 21, 2020. |                                                                                     |                                                                |                              | <u>GROUNDWATER LEVEL INFORMATION:</u><br>Groundwater was not observed during drilling or after completion.<br><u>GENERAL NOTES:</u> |                      |                    |                |                  |              |                                     |                              |
| 25           |                                                                                    |                                                                                                                                            |                                                                                     |                                                                |                              |                                                                                                                                     |                      |                    |                |                  |              |                                     |                              |
| 30           |                                                                                    |                                                                                                                                            |                                                                                     |                                                                |                              |                                                                                                                                     |                      |                    |                |                  |              |                                     |                              |

|                                                                  |                                                  |                                                                               |                                |
|------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------|
| <br><b>KLEINFELDER</b><br><i>Bright People. Right Solutions.</i> | PROJECT NO.:<br>20210045.001A                    | <b>BORING LOG B-4</b>                                                         | APPENDIX                       |
|                                                                  | DRAWN BY: AA<br>CHECKED BY: ES<br>DATE: 6/4/2020 | PROPOSED HANFORD PLACE<br>MEDICAL & MIXED-USE PROPERTY<br>HANFORD, CALIFORNIA | <b>A-6</b><br><br>PAGE: 1 of 1 |

|                          |               |                            |                   |                                                  |
|--------------------------|---------------|----------------------------|-------------------|--------------------------------------------------|
| <b>Date Begin - End:</b> | 4/21/2020     | <b>Drilling Company:</b>   | Moore Twining     | <b>BORING LOG B-5</b>                            |
| <b>Logged By:</b>        | J. Green      | <b>Drill Crew:</b>         |                   |                                                  |
| <b>Hor.-Vert. Datum:</b> | Not Available | <b>Drilling Equipment:</b> | CME-75            | <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |
| <b>Plunge:</b>           | -90 degrees   | <b>Drilling Method:</b>    | Hollow Stem Auger | <b>Hammer Efficiency:</b> 86.4%                  |
| <b>Weather:</b>          | Not Available | <b>Auger Diameter:</b>     | 8 in. O.D.        | <b>Hammer Cal. Date:</b> 5/14/2019               |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                                                          |             |                                                                |                              |                       | LABORATORY RESULTS                                                                                                    |                    |                |                  |              |                                     |                              |
|--------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------|------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                                                           | Sample Type | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%)                                                                                                  | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks |
|              |               | Lithologic Description                                                                                                                     |             |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
|              |               | <b>Silty SAND (SM):</b> medium dense, brown, moist, fine-grained, non-plastic, pinholes                                                    |             |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 5            |               |                                                                                                                                            |             | BC=18<br>19<br>20                                              |                              | 56                    | 4.8                                                                                                                   | 101.5              |                |                  |              |                                     |                              |
|              |               |                                                                                                                                            |             | BC=9<br>13<br>15                                               |                              | 40                    | 6.6                                                                                                                   | 94.9               |                |                  |              |                                     |                              |
| 10           |               | light brown                                                                                                                                |             | BC=11<br>7<br>7                                                |                              | 20                    |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 15           |               | dense                                                                                                                                      |             | BC=11<br>20<br>24                                              |                              | 63                    |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 20           |               | The boring was terminated at approximately 16.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 21, 2020. |             |                                                                |                              |                       | GROUNDWATER LEVEL INFORMATION:<br>Groundwater was not observed during drilling or after completion.<br>GENERAL NOTES: |                    |                |                  |              |                                     |                              |
| 25           |               |                                                                                                                                            |             |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 30           |               |                                                                                                                                            |             |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |

PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

DATE: 6/4/2020

## BORING LOG B-5

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

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|                                        |                                           |                                                  |
|----------------------------------------|-------------------------------------------|--------------------------------------------------|
| <b>Date Begin - End:</b> 4/21/2020     | <b>Drilling Company:</b> Moore Twining    | <b>BORING LOG B-6</b>                            |
| <b>Logged By:</b> J. Green             | <b>Drill Crew:</b>                        |                                                  |
| <b>Hor.-Vert. Datum:</b> Not Available | <b>Drilling Equipment:</b> CME-75         | <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |
| <b>Plunge:</b> -90 degrees             | <b>Drilling Method:</b> Hollow Stem Auger | <b>Hammer Efficiency:</b> 86.4%                  |
| <b>Weather:</b> Not Available          | <b>Auger Diameter:</b> 8 in. O.D.         | <b>Hammer Cal. Date:</b> 5/14/2019               |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                     |             |                                                                |                              | LABORATORY RESULTS    |                      |                    |                |                  |              |                                     |                              |                                                                                         |
|--------------|---------------|-------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------|------------------------------|-----------------------|----------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|-----------------------------------------------------------------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                      | Sample Type | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%) | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks |                                                                                         |
|              |               | Lithologic Description                                                                                |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |                                                                                         |
|              |               | <b>Silty SAND (SM):</b> medium dense, brown, moist, fine-grained, non-plastic, pin holes and organics |             | BC=7<br>4<br>8                                                 |                              | 17                    | 5.0                  | 97.3               |                |                  |              |                                     |                              | <b>ASTM D1557 Method A=</b><br>Max. Dry Unit Wt.: 121.8 pcf<br>Opt. Water Content: 9.8% |
| 5            |               |                                                                                                       |             | BC=3<br>5<br>6                                                 |                              | 16                    |                      |                    |                |                  |              |                                     |                              |                                                                                         |
|              |               | reddish brown                                                                                         |             | BC=14<br>11<br>13                                              |                              | 35                    | 3.1                  | 95.9               |                |                  |              |                                     |                              |                                                                                         |
| 10           |               |                                                                                                       |             | BC=2<br>2<br>4                                                 |                              | 9                     |                      |                    |                |                  |              |                                     |                              |                                                                                         |
| 15           |               | <b>Poorly Graded SAND (SP):</b> medium dense, grayish brown, moist                                    |             | BC=8<br>9<br>11                                                |                              | 29                    |                      |                    |                |                  |              |                                     |                              |                                                                                         |
| 20           |               | <b>Sandy SILT (ML):</b> stiff, dark brown, moist                                                      |             | BC=2<br>4<br>8                                                 |                              | 17                    |                      |                    | 70             |                  |              |                                     |                              |                                                                                         |
| 25           |               | <b>Poorly Graded SAND (SP):</b> medium dense, grayish brown, moist, fine-grained                      |             | BC=13<br>8<br>25                                               |                              | 48                    | 1.9                  | 100.9              |                |                  |              |                                     |                              |                                                                                         |
| 30           |               | <b>SILTY CLAY (CL-ML):</b> medium stiff, dark gray, moist, medium plasticity                          |             | BC=7<br>8<br>10                                                |                              | 26                    |                      |                    |                |                  | 24           | 7                                   |                              |                                                                                         |

|  |                                                  |                                                                               |                                |
|--|--------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------|
|  | PROJECT NO.:<br>20210045.001A                    | <b>BORING LOG B-6</b>                                                         | APPENDIX                       |
|  | DRAWN BY: AA<br>CHECKED BY: ES<br>DATE: 6/4/2020 | PROPOSED HANFORD PLACE<br>MEDICAL & MIXED-USE PROPERTY<br>HANFORD, CALIFORNIA | <b>A-8</b><br><br>PAGE: 1 of 2 |

|                                                  |                                           |                       |
|--------------------------------------------------|-------------------------------------------|-----------------------|
| <b>Date Begin - End:</b> 4/21/2020               | <b>Drilling Company:</b> Moore Twining    | <b>BORING LOG B-6</b> |
| <b>Logged By:</b> J. Green                       | <b>Drill Crew:</b>                        |                       |
| <b>Hor.-Vert. Datum:</b> Not Available           | <b>Drilling Equipment:</b> CME-75         |                       |
| <b>Plunge:</b> -90 degrees                       | <b>Drilling Method:</b> Hollow Stem Auger |                       |
| <b>Weather:</b> Not Available                    | <b>Auger Diameter:</b> 8 in. O.D.         |                       |
| <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |                                           |                       |
| <b>Hammer Efficiency:</b> 86.4%                  |                                           |                       |
| <b>Hammer Cal. Date:</b> 5/14/2019               |                                           |                       |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                                                          |             |                                                                |                              | LABORATORY RESULTS                                                                                                    |                      |                    |                |                  |              |                                     | Additional Tests/<br>Remarks |
|--------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                                                           | Sample Type | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value                                                                                                 | Water<br>Content (%) | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) |                              |
|              |               |                                                                                                                                            |             | BC=9<br>13<br>25                                               |                              | 55                                                                                                                    |                      |                    |                |                  |              |                                     |                              |
|              |               | Poorly Graded SAND (SP): medium dense, light brownish gray, moist, fine-grained, non-plastic                                               |             |                                                                |                              |                                                                                                                       |                      |                    |                |                  |              |                                     |                              |
| 40           |               | Sandy SILTY CLAY (CL-ML): very stiff, dark gray, moist, low to medium plasticity, fine-grained sand                                        |             | BC=6<br>8<br>11                                                |                              | 27                                                                                                                    |                      |                    |                |                  | 26           | 7                                   |                              |
| 45           |               |                                                                                                                                            |             | BC=8<br>13<br>19                                               |                              | 46                                                                                                                    | 2.9                  | 99.6               |                |                  |              |                                     |                              |
| 50           |               |                                                                                                                                            |             | BC=11<br>12<br>14                                              |                              | 37                                                                                                                    |                      |                    |                |                  |              |                                     |                              |
| 55           |               | The boring was terminated at approximately 51.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 21, 2020. |             |                                                                |                              | GROUNDWATER LEVEL INFORMATION:<br>Groundwater was not observed during drilling or after completion.<br>GENERAL NOTES: |                      |                    |                |                  |              |                                     |                              |
| 60           |               |                                                                                                                                            |             |                                                                |                              |                                                                                                                       |                      |                    |                |                  |              |                                     |                              |
| 65           |               |                                                                                                                                            |             |                                                                |                              |                                                                                                                       |                      |                    |                |                  |              |                                     |                              |

PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

DATE: 6/4/2020

## BORING LOG B-6

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

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|                                        |                                           |                                                  |
|----------------------------------------|-------------------------------------------|--------------------------------------------------|
| <b>Date Begin - End:</b> 4/20/2020     | <b>Drilling Company:</b> Moore Twining    | <b>BORING LOG B-7</b>                            |
| <b>Logged By:</b> J. Green             | <b>Drill Crew:</b>                        |                                                  |
| <b>Hor.-Vert. Datum:</b> Not Available | <b>Drilling Equipment:</b> CME-75         | <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |
| <b>Plunge:</b> -90 degrees             | <b>Drilling Method:</b> Hollow Stem Auger | <b>Hammer Efficiency:</b> 86.4%                  |
| <b>Weather:</b> Not Available          | <b>Auger Diameter:</b> 8 in. O.D.         | <b>Hammer Cal. Date:</b> 5/14/2019               |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                     |             |                                                                |                              | LABORATORY RESULTS    |                      |                    |                |                  |              |                                     |                                                                                                                     |
|--------------|---------------|-------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------|------------------------------|-----------------------|----------------------|--------------------|----------------|------------------|--------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                      | Sample Type | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%) | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks                                                                                        |
|              |               | Lithologic Description                                                                                |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
|              |               | <b>Sandy SILT (ML):</b> light brown, moist, non-plastic, fine-grained sand                            |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     | <b>ASTM D1557 Method A=</b><br>Max. Dry Unit Wt.: 124.8 pcf<br>Opt. Water Content: 8.5%<br><br><b>Consolidation</b> |
|              |               | <b>Silty SAND (SM):</b> medium dense, light brown, moist, fine-grained, non-plastic to low plasticity |             |                                                                | 58                           | 4.5                   | 111.0                |                    |                |                  |              |                                     |                                                                                                                     |
| 5            |               |                                                                                                       |             |                                                                | 24                           | 6.3                   | 94.6                 |                    |                |                  |              |                                     |                                                                                                                     |
|              |               |                                                                                                       |             |                                                                | 30                           | 7.9                   | 97.8                 |                    |                |                  |              |                                     |                                                                                                                     |
| 10           |               |                                                                                                       |             |                                                                | 19                           |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
|              |               |                                                                                                       |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
| 15           |               | <b>Poorly Graded SAND (SP):</b> medium dense, gray with light orange, moist, fine to medium-grained   |             |                                                                | 6                            |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
|              |               |                                                                                                       |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
| 20           |               | reddish brown                                                                                         |             |                                                                | 35                           |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
|              |               |                                                                                                       |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
| 25           |               | <b>Lean CLAY (CL):</b> very stiff, gray, moist, medium plasticity, trace fine-grained sand            |             |                                                                | 23                           |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
|              |               |                                                                                                       |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |
| 30           |               | <b>Silty SAND (SM):</b> dense, brown, moist, fine-grained, non-plastic to low plasticity              |             |                                                                | 86                           | 11.6                  | 112.9                |                    |                |                  |              |                                     |                                                                                                                     |
|              |               |                                                                                                       |             |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                                                                                                                     |

|                                                                  |                               |                                                                               |              |
|------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------|--------------|
| <br><b>KLEINFELDER</b><br><i>Bright People. Right Solutions.</i> | PROJECT NO.:<br>20210045.001A | <b>BORING LOG B-7</b>                                                         | APPENDIX     |
|                                                                  | DRAWN BY: AA                  | PROPOSED HANFORD PLACE<br>MEDICAL & MIXED-USE PROPERTY<br>HANFORD, CALIFORNIA | <b>A-9</b>   |
|                                                                  | CHECKED BY: ES                |                                                                               | PAGE: 1 of 2 |
|                                                                  | DATE: 6/4/2020                |                                                                               |              |



|                          |               |                            |                   |                                                  |
|--------------------------|---------------|----------------------------|-------------------|--------------------------------------------------|
| <b>Date Begin - End:</b> | 4/20/2020     | <b>Drilling Company:</b>   | Moore Twining     | <b>BORING LOG B-7</b>                            |
| <b>Logged By:</b>        | J. Green      | <b>Drill Crew:</b>         |                   |                                                  |
| <b>Hor.-Vert. Datum:</b> | Not Available | <b>Drilling Equipment:</b> | CME-75            | <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |
| <b>Plunge:</b>           | -90 degrees   | <b>Drilling Method:</b>    | Hollow Stem Auger | <b>Hammer Efficiency:</b> 86.4%                  |
| <b>Weather:</b>          | Not Available | <b>Auger Diameter:</b>     | 8 in. O.D.        | <b>Hammer Cal. Date:</b> 5/14/2019               |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                                                                           |                   |                                                                |                              | LABORATORY RESULTS    |                      |                    |                |                  |              |                                     |                              |
|--------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------|------------------------------|-----------------------|----------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                                                                            | Sample Type       | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%) | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks |
|              |               | Lithologic Description                                                                                                                                      |                   |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |
|              |               | <b>Poorly Graded SAND (SP):</b> medium dense, light gray, moist, fine-grained                                                                               | BC=11<br>13<br>16 |                                                                | 42                           |                       |                      |                    |                |                  |              |                                     |                              |
| 40           |               | <b>Silty CLAY (CL-ML):</b> hard, light brown, moist, low plasticity                                                                                         | BC=20<br>25<br>31 |                                                                | 81                           |                       |                      |                    |                |                  |              |                                     |                              |
|              |               | <b>Poorly Graded SAND (SP):</b> dense, light gray, moist, fine-grained                                                                                      |                   |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |
| 45           |               | wet                                                                                                                                                         | BC=5<br>7<br>9    |                                                                | 23                           |                       |                      |                    |                |                  |              |                                     |                              |
|              |               | <b>Silty CLAY (CL-ML):</b> very stiff, dark greenish gray, wet, low plasticity                                                                              |                   |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |
| 50           |               |                                                                                                                                                             | BC=10<br>11<br>15 |                                                                | 37                           | 28.3                  |                      |                    |                |                  |              |                                     |                              |
| 55           |               | The boring was terminated at approximately 51.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 20, 2020.                  |                   |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |
| 60           |               | GROUNDWATER LEVEL INFORMATION:<br>⚡ Perched groundwater was observed at approximately 45 ft. below ground surface during drilling.<br><u>GENERAL NOTES:</u> |                   |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |
| 65           |               |                                                                                                                                                             |                   |                                                                |                              |                       |                      |                    |                |                  |              |                                     |                              |

PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

DATE: 6/4/2020

## BORING LOG B-7

PROPOSED HANFORD PLACE  
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HANFORD, CALIFORNIA

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|--------------------------|---------------|----------------------------|-------------------|--------------------------------------------------|
| <b>Date Begin - End:</b> | 4/20/2020     | <b>Drilling Company:</b>   | Moore Twining     | <b>BORING LOG B-8</b>                            |
| <b>Logged By:</b>        | J. Green      | <b>Drill Crew:</b>         |                   |                                                  |
| <b>Hor.-Vert. Datum:</b> | Not Available | <b>Drilling Equipment:</b> | CME-75            | <b>Hammer Type - Drop:</b> 140 lb. Auto - 30 in. |
| <b>Plunge:</b>           | -90 degrees   | <b>Drilling Method:</b>    | Hollow Stem Auger | <b>Hammer Efficiency:</b> 86.4%                  |
| <b>Weather:</b>          | Not Available | <b>Auger Diameter:</b>     | 8 in. O.D.        | <b>Hammer Cal. Date:</b> 5/14/2019               |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                                                          |             |                                                                |                              |                       | LABORATORY RESULTS                                                                                                                  |                    |                |                  |              |                                     |                                                                                                             |
|--------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------|------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------|------------------|--------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                                                           | Sample Type | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= tsf | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%)                                                                                                                | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks                                                                                |
|              |               | Lithologic Description                                                                                                                     |             |                                                                |                              |                       |                                                                                                                                     |                    |                |                  |              |                                     |                                                                                                             |
|              |               | <b>SILT (ML):</b> medium dense, light brown, moist, fine-grained, non-plastic to low plasticity, pinholes                                  |             | BC=9<br>11<br>12                                               |                              | 33                    | 5.1                                                                                                                                 | 100.3              |                |                  |              |                                     | <b>Direct Shear=</b><br>Peak Cohesion: 133.33 psf<br>Peak Friction Angle: 30.5°<br>Peak Tangent Angle: 0.57 |
| 5            |               | <b>Silty SAND (SM):</b> medium dense, light brown, moist, low plasticity, weakly to moderately cemented, pinholes                          |             | BC=9<br>11<br>15                                               |                              | 37                    |                                                                                                                                     |                    |                |                  |              |                                     |                                                                                                             |
|              |               | <b>Sandy SILT (ML):</b> very stiff, brown, moist, fine-grained, low plasticity                                                             |             | BC=18<br>21<br>17                                              |                              | 55                    | 2.4                                                                                                                                 | 99.5               |                |                  |              |                                     |                                                                                                             |
| 10           |               | stiff                                                                                                                                      |             | BC=4<br>4<br>5                                                 |                              | 13                    |                                                                                                                                     |                    |                |                  |              |                                     |                                                                                                             |
| 15           |               | <b>Sandy Lean CLAY (CL):</b> medium stiff, dark brown, moist, low to medium plasticity                                                     |             | BC=3<br>4<br>8                                                 |                              | 17                    | 20.6                                                                                                                                | 104.6              |                |                  |              |                                     |                                                                                                             |
| 20           |               | stiff, gray                                                                                                                                |             | BC=8<br>8<br>9                                                 |                              | 24                    |                                                                                                                                     |                    |                |                  |              |                                     |                                                                                                             |
| 25           |               |                                                                                                                                            |             | BC=7<br>10<br>25                                               |                              | 50                    |                                                                                                                                     |                    |                |                  |              |                                     |                                                                                                             |
| 30           |               | The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 20, 2020. |             |                                                                |                              |                       | <b>GROUNDWATER LEVEL INFORMATION:</b><br>Groundwater was not observed during drilling or after completion.<br><b>GENERAL NOTES:</b> |                    |                |                  |              |                                     |                                                                                                             |

PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

DATE: 6/4/2020

## BORING LOG B-8

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

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|---------------------------------|--|------------------------------------|--|-------------------------------------------|--|--|--|
| Date Begin - End: 4/20/2020     |  | Drilling Company: Moore Twining    |  | BORING LOG B-9                            |  |  |  |
| Logged By: J. Green             |  | Drill Crew:                        |  |                                           |  |  |  |
| Hor.-Vert. Datum: Not Available |  | Drilling Equipment: CME-75         |  | Hammer Type - Drop: 140 lb. Auto - 30 in. |  |  |  |
| Plunge: -90 degrees             |  | Drilling Method: Hollow Stem Auger |  | Hammer Efficiency: 86.4%                  |  |  |  |
| Weather: Not Available          |  | Auger Diameter: 8 in. O.D.         |  | Hammer Cal. Date: 5/14/2019               |  |  |  |

| Depth (feet) | Graphical Log | FIELD EXPLORATION                                                                                                                          |                   |                                                                |                              |                       | LABORATORY RESULTS                                                                                                    |                    |                |                  |              |                                     |                              |
|--------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------|------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------|----------------|------------------|--------------|-------------------------------------|------------------------------|
|              |               | Surface Condition: Grass & Weeds                                                                                                           | Sample Type       | Blow Counts(BC)=<br>Uncorr. Blows/6 in.<br>Pocket Pen(PP)= 1st | Recovery<br>(NR=No Recovery) | N <sub>60</sub> Value | Water<br>Content (%)                                                                                                  | Dry Unit Wt. (pcf) | Passing #4 (%) | Passing #200 (%) | Liquid Limit | Plasticity Index<br>(NP=NonPlastic) | Additional Tests/<br>Remarks |
|              |               |                                                                                                                                            |                   |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
|              |               | <b>Sandy SILT (ML):</b> very stiff, grayish brown, moist, non-plastic                                                                      |                   |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
|              |               |                                                                                                                                            | BC=9<br>12<br>17  |                                                                | 42                           | 7.1                   | 92.0                                                                                                                  |                    | 57             |                  |              |                                     | Consolidation                |
| 5            |               | <b>Silty SAND (SM):</b> medium dense, grayish brown, moist, fine-grained, non-plastic                                                      | BC=7<br>7<br>9    |                                                                | 23                           |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 10           |               | brown                                                                                                                                      | BC=7<br>18<br>23  |                                                                | 59                           |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 15           |               | reddish brown                                                                                                                              | BC=6<br>6<br>11   |                                                                | 24                           |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 20           |               | <b>Poorly Graded SAND (SP):</b> dense, gray, moist, fine-grained, non-plastic                                                              | BC=25<br>26<br>28 |                                                                | 78                           |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |
| 25           |               | The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with auger cuttings on April 20, 2020. |                   |                                                                |                              |                       | GROUNDWATER LEVEL INFORMATION:<br>Groundwater was not observed during drilling or after completion.<br>GENERAL NOTES: |                    |                |                  |              |                                     |                              |
| 30           |               |                                                                                                                                            |                   |                                                                |                              |                       |                                                                                                                       |                    |                |                  |              |                                     |                              |

|                                                                                     |                                                  |                |          |
|-------------------------------------------------------------------------------------|--------------------------------------------------|----------------|----------|
|  | PROJECT NO.:<br>20210045.001A                    | BORING LOG B-9 | APPENDIX |
|                                                                                     | DRAWN BY: AA<br>CHECKED BY: ES<br>DATE: 6/4/2020 |                |          |

A-11

PAGE: 1 of 1

## APPENDIX B

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|                    |           |
|--------------------|-----------|
| Laboratory Summary | B-1/B-2   |
| Sieve Analysis     | B-3       |
| Atterberg Limits   | B-4       |
| Direct Shear       | B-5/B-6   |
| Collapse Potential | B-7/B-10  |
| Resistance Value   | B-11/B-17 |

| Exploration ID | Depth (ft.) | Sample Description       | Water Content (%) | Dry Unit Wt. (pcf) | Sieve Analysis (%) |            |              | Atterberg Limits |               |                  | Additional Tests                   |
|----------------|-------------|--------------------------|-------------------|--------------------|--------------------|------------|--------------|------------------|---------------|------------------|------------------------------------|
|                |             |                          |                   |                    | Passing 3/4"       | Passing #4 | Passing #200 | Liquid Limit     | Plastic Limit | Plasticity Index |                                    |
| B-1            | 3.0         | SILTY SAND (SM)          | 2.4               | 108.6              |                    |            |              |                  |               |                  |                                    |
| B-1            | 5.0         | SANDY SILT (ML)          | 4.8               | 88.1               |                    |            |              |                  |               |                  |                                    |
| B-1            | 6.0         | SANDY SILT (ML)          | 4.7               | 106.4              |                    |            |              |                  |               |                  | Consolidation                      |
| B-1            | 17.0        | SANDY SILT (ML)          | 10.9              | 107.9              |                    |            |              |                  |               |                  |                                    |
| B-2            | 2.0         | SANDY SILT (ML)          |                   |                    |                    |            | 60           |                  |               |                  |                                    |
| B-2            | 10.0        | SILTY SAND (SM)          | 6.5               | 98.8               |                    |            |              |                  |               |                  |                                    |
| B-3            | 1.0         | SILTY SAND (SM)          | 6.9               | 96.8               |                    |            |              |                  |               |                  | Consolidation                      |
| B-3            | 1.5         | SILTY SAND (SM)          |                   |                    |                    |            |              |                  |               |                  | Direct Shear=                      |
|                |             |                          |                   |                    |                    |            |              |                  |               |                  | Peak Cohesion: 740 psf             |
|                |             |                          |                   |                    |                    |            |              |                  |               |                  | Peak Friction Angle: 27.0°         |
|                |             |                          |                   |                    |                    |            |              |                  |               |                  | Peak Tangent Angle: 0.52           |
| B-3            | 5.0         | SILTY SAND (SM)          | 3.2               | 96.0               |                    |            |              |                  |               |                  |                                    |
| B-4            | 5.0         | SILTY SAND (SM)          | 3.5               | 95.5               |                    |            |              |                  |               |                  |                                    |
| B-5            | 3.0         | SILTY SAND (SM)          | 4.8               | 101.5              |                    |            |              |                  |               |                  |                                    |
| B-5            | 5.0         | SILTY SAND (SM)          | 6.6               | 94.9               |                    |            |              |                  |               |                  |                                    |
| B-6            | 0.0 - 0.5   | SILTY SAND (SM)          |                   |                    |                    |            |              |                  |               |                  | ASTM D1557 Method A=               |
|                |             |                          |                   |                    |                    |            |              |                  |               |                  | Maximum Dry Unit Weight: 121.8 pcf |
|                |             |                          |                   |                    |                    |            |              |                  |               |                  | Optimum Water Content: 9.8%        |
| B-6            | 2.0         | SILTY SAND (SM)          | 5.0               | 97.3               |                    |            |              |                  |               |                  |                                    |
| B-6            | 7.5         | SILTY SAND (SM)          | 3.1               | 95.9               |                    |            |              |                  |               |                  |                                    |
| B-6            | 20.0        | SANDY SILT (ML)          |                   |                    |                    |            | 70           |                  |               |                  |                                    |
| B-6            | 25.0        | POORLY GRADED SAND (SP)  | 1.9               | 100.9              |                    |            |              |                  |               |                  |                                    |
| B-6            | 30.0        | SILTY CLAY (CL-ML)       |                   |                    |                    |            |              | 24               | 17            | 7                |                                    |
| B-6            | 40.0        | SANDY SILTY CLAY (CL-ML) |                   |                    |                    |            |              | 26               | 19            | 7                |                                    |
| B-6            | 45.0        | SANDY SILTY CLAY (CL-ML) | 2.9               | 99.6               |                    |            |              |                  |               |                  |                                    |
| B-7            | 0.0 - 2.0   | SANDY SILT (ML)          |                   |                    |                    |            |              |                  |               |                  | ASTM D1557 Method A=               |
|                |             |                          |                   |                    |                    |            |              |                  |               |                  | Maximum Dry Unit Weight: 124.8 pcf |
|                |             |                          |                   |                    |                    |            |              |                  |               |                  | Optimum Water Content: 8.5%        |

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.  
NP = NonPlastic



PROJECT NO.:  
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## LABORATORY TEST RESULT SUMMARY

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

B-1



| Exploration ID | Depth (ft.) | Sample Description   | Water Content (%) | Dry Unit Wt. (pcf) | Sieve Analysis (%) |            |              | Atterberg Limits |               |                  | Additional Tests           |
|----------------|-------------|----------------------|-------------------|--------------------|--------------------|------------|--------------|------------------|---------------|------------------|----------------------------|
|                |             |                      |                   |                    | Passing 3/4"       | Passing #4 | Passing #200 | Liquid Limit     | Plastic Limit | Plasticity Index |                            |
| B-7            | 2.0         | SILTY SAND (SM)      | 4.5               | 111.0              |                    |            |              |                  |               |                  |                            |
| B-7            | 6.0         | SILTY SAND (SM)      | 6.3               | 94.6               |                    |            |              |                  |               |                  |                            |
| B-7            | 7.5         | SILTY SAND (SM)      | 7.9               | 97.8               |                    |            |              |                  |               |                  | Consolidation              |
| B-7            | 30.0        | SILTY SAND (SM)      | 11.6              | 112.9              |                    |            |              |                  |               |                  |                            |
| B-7            | 50.0        | SILTY CLAY (CL-ML)   | 28.3              |                    |                    |            |              |                  |               |                  |                            |
| B-8            | 2.0         | SILT (ML)            | 5.1               | 100.3              |                    |            |              |                  |               |                  | Direct Shear=              |
|                |             |                      |                   |                    |                    |            |              |                  |               |                  | Peak Cohesion: 133.33 psf  |
|                |             |                      |                   |                    |                    |            |              |                  |               |                  | Peak Friction Angle: 30.5° |
|                |             |                      |                   |                    |                    |            |              |                  |               |                  | Peak Tangent Angle: 0.57   |
| B-8            | 7.5         | SANDY SILT (ML)      | 2.4               | 99.5               |                    |            |              |                  |               |                  |                            |
| B-8            | 15.0        | SANDY LEAN CLAY (CL) | 20.6              | 104.6              |                    |            |              |                  |               |                  |                            |
| B-9            | 2.0         | SANDY SILT (ML)      | 7.1               | 92.0               |                    |            | 57           |                  |               |                  | Consolidation              |
| RV-1           | 0.0 - 3.0   | SILTY SAND (SM)      |                   |                    |                    |            |              |                  |               |                  | R-Value= 70                |
| RV-2           | 0.0 - 3.0   | SILTY SAND (SM)      |                   |                    |                    |            |              |                  |               |                  | R-Value= 63                |
| RV-3           | 0.0 - 3.0   | SANDY SILT (ML)      |                   |                    |                    |            |              |                  |               |                  | R-Value= 41                |
| RV-4           | 0.0 - 3.0   | SANDY SILT (ML)      |                   |                    |                    |            |              |                  |               |                  | R-Value= 53                |
| RV-5           | 0.0 - 3.0   | SILT (ML)            |                   |                    |                    |            |              |                  |               |                  | R-Value= 14                |
| RV-6           | 0.0 - 3.0   | SILTY SAND (SM)      |                   |                    |                    |            |              |                  |               |                  | R-Value= 62                |
| RV-7           | 0.0 - 3.0   | SANDY SILT (ML)      |                   |                    |                    |            |              |                  |               |                  | R-Value= 21                |

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.  
NP = NonPlastic



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20210045.001A

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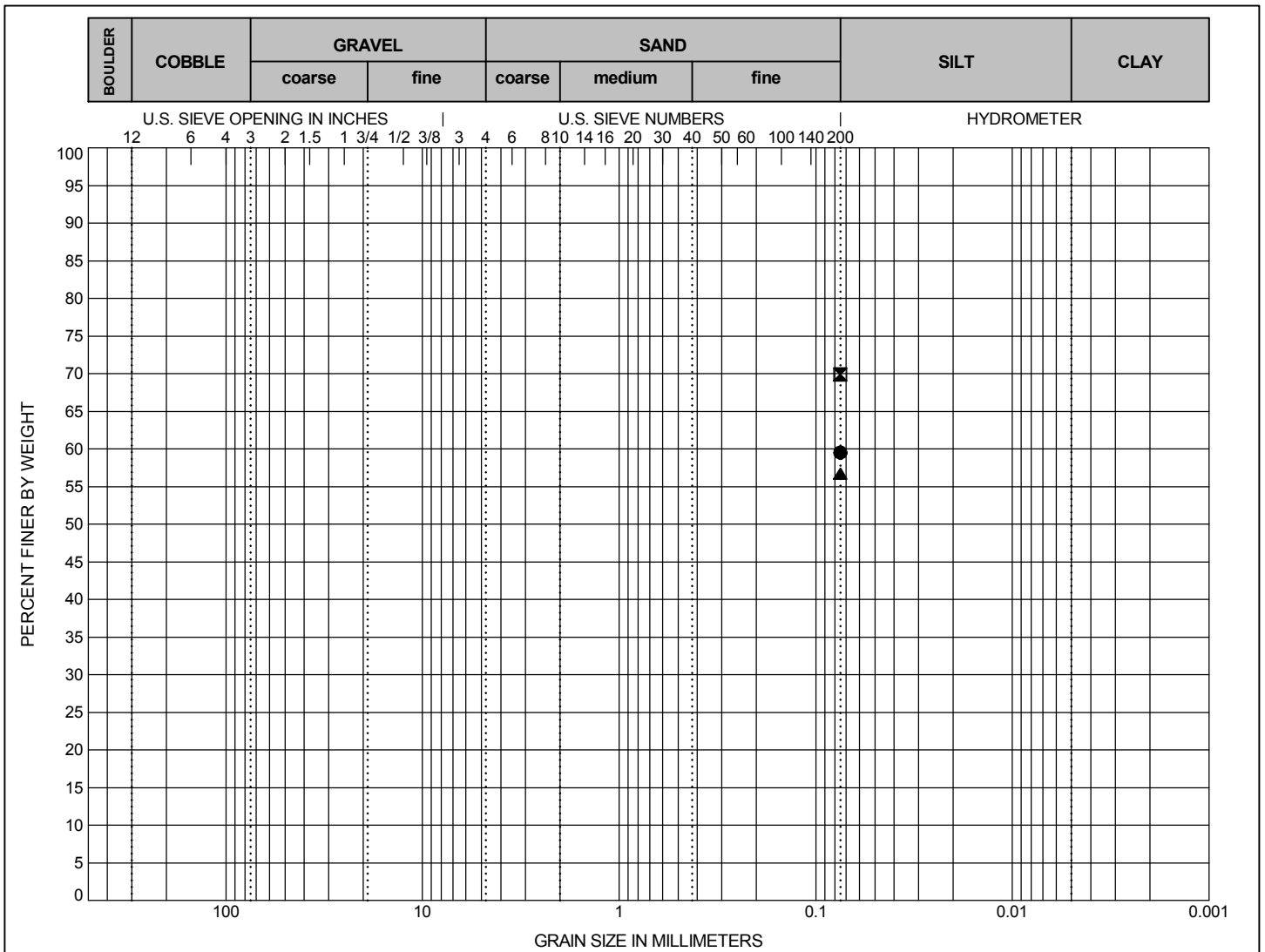
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## LABORATORY TEST RESULT SUMMARY

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

**B-2**

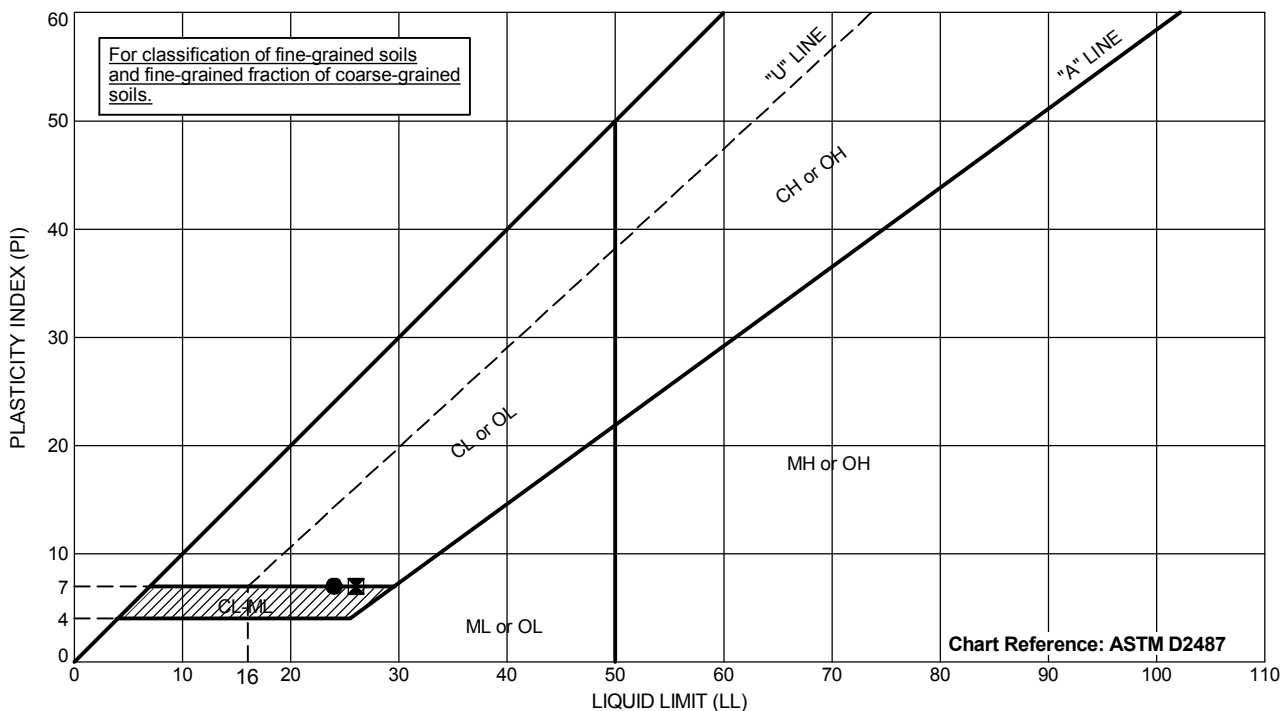


| Exploration ID |     | Depth (ft.) | Sample Description |                 |                 |                 |                |                |              |            | LL           | PL    | PI    |
|----------------|-----|-------------|--------------------|-----------------|-----------------|-----------------|----------------|----------------|--------------|------------|--------------|-------|-------|
| ●              | B-2 | 2           | SANDY SILT (ML)    |                 |                 |                 |                |                |              |            | NM           | NM    | NM    |
| ☒              | B-6 | 20          | SANDY SILT (ML)    |                 |                 |                 |                |                |              |            | NM           | NM    | NM    |
| ▲              | B-9 | 2           | SANDY SILT (ML)    |                 |                 |                 |                |                |              |            | NM           | NM    | NM    |
|                |     |             |                    |                 |                 |                 |                |                |              |            |              |       |       |
|                |     |             |                    |                 |                 |                 |                |                |              |            |              |       |       |
| Exploration ID |     | Depth (ft.) | D <sub>100</sub>   | D <sub>60</sub> | D <sub>30</sub> | D <sub>10</sub> | C <sub>c</sub> | C <sub>u</sub> | Passing 3/4" | Passing #4 | Passing #200 | %Silt | %Clay |
| ●              | B-2 | 2           | 0.075              | NM              | NM              | NM              | NM             | NM             |              |            | 60           | NM    | NM    |
| ☒              | B-6 | 20          | 0.075              | NM              | NM              | NM              | NM             | NM             |              |            | 70           | NM    | NM    |
| ▲              | B-9 | 2           | 0.075              | NM              | NM              | NM              | NM             | NM             |              |            | 57           | NM    | NM    |
|                |     |             |                    |                 |                 |                 |                |                |              |            |              |       |       |
|                |     |             |                    |                 |                 |                 |                |                |              |            |              |       |       |

Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D6913 (Sieve Analysis) and ASTM D7928 (Hydrometer Analysis).  
 NP = Nonplastic  
 NM = Not Measured

Coefficients of Uniformity -  $C_u = D_{60} / D_{10}$   
 Coefficients of Curvature -  $C_c = (D_{30})^2 / D_{60} D_{10}$   
 D<sub>60</sub> = Grain diameter at 60% passing  
 D<sub>30</sub> = Grain diameter at 30% passing  
 D<sub>10</sub> = Grain diameter at 10% passing

|  |                                                  |                                                                               |          |
|--|--------------------------------------------------|-------------------------------------------------------------------------------|----------|
|  | PROJECT NO.:<br>20210045.001A                    | SIEVE ANALYSIS                                                                | APPENDIX |
|  | DRAWN BY: AA<br>CHECKED BY: ES<br>DATE: 6/4/2020 | PROPOSED HANFORD PLACE<br>MEDICAL & MIXED-USE PROPERTY<br>HANFORD, CALIFORNIA | B-3      |



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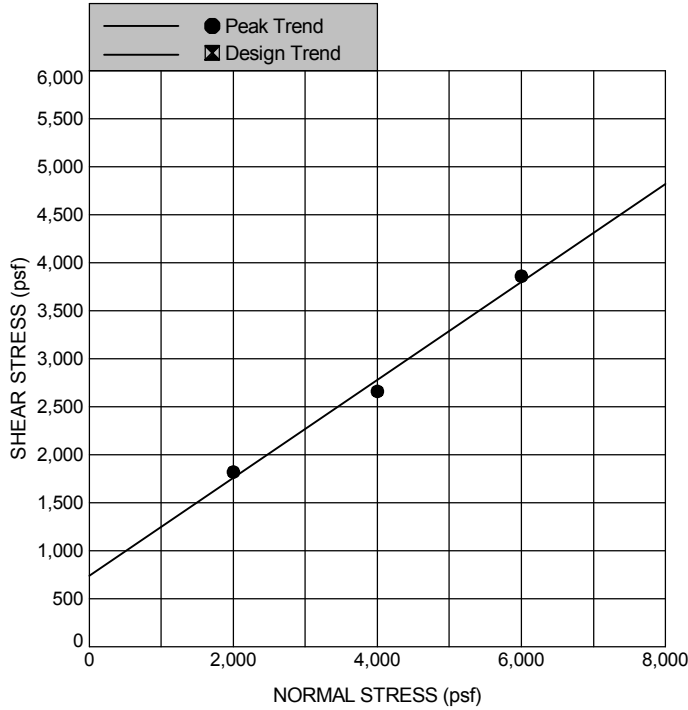
PROJECT NUMBER: 20210045.001A  
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| Exploration ID | Depth (ft.) | Sample Description       | Passing #200 | LL | PL | PI |
|----------------|-------------|--------------------------|--------------|----|----|----|
| ● B-6          | 30          | SILTY CLAY (CL-ML)       | NM           | 24 | 17 | 7  |
| ☒ B-6          | 40          | SANDY SILTY CLAY (CL-ML) | NM           | 26 | 19 | 7  |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
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|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |
|                |             |                          |              |    |    |    |

Testing performed in general accordance with ASTM D4318.  
 NP = Nonplastic  
 NM = Not Measured



|                                                  |                  |                     |
|--------------------------------------------------|------------------|---------------------|
| PROJECT NO.:<br>20210045.001A                    | ATTERBERG LIMITS | APPENDIX<br><br>B-4 |
| DRAWN BY: AA<br>CHECKED BY: ES<br>DATE: 6/4/2020 |                  |                     |



| Exploration ID |              | Depth (ft.)             | Sample Description    |                           |                              |                         |                      |
|----------------|--------------|-------------------------|-----------------------|---------------------------|------------------------------|-------------------------|----------------------|
| B-3            |              | 1.5                     | SILTY SAND (SM)       |                           |                              |                         |                      |
| Passing #4 (%) |              | Passing #200 (%)        |                       | Liquid Limit              | Plastic Limit                | Plasticity Index        | Specific Gravity     |
| NM             |              | NM                      |                       | NM                        | NM                           | NM                      | 2.65                 |
| Initial        | Specimen No. | Water Content (%)       | Dry Unit Weight (pcf) | Saturation (%)            | Void Ratio                   | Area (in <sup>2</sup> ) | Height (in)          |
|                | 1            | 6.1                     | 94.7                  | 21.6                      | 0.746                        | 4.60                    | 0.96                 |
|                | 2            | 6.2                     | 95.6                  | 22.5                      | 0.730                        | 4.60                    | 0.96                 |
|                | 3            | 7.0                     | 95.5                  | 25.5                      | 0.731                        | 4.60                    | 0.96                 |
| At Test        | Specimen No. | Water Content (%)       | Dry Unit Weight (pcf) | Saturation (%)            | Void Ratio                   | Area (in <sup>2</sup> ) | Height (in)          |
|                | 1            | 25.3                    | 105.5                 | 26.7                      | 0.621                        | 4.60                    | 0.89                 |
|                | 2            | 23.8                    | 111.4                 | 26.5                      | 0.559                        | 4.60                    | 0.87                 |
|                | 3            | 22.7                    | 111.7                 | 25.4                      | 0.539                        | 4.60                    | 0.85                 |
|                |              |                         |                       |                           |                              |                         |                      |
| Specimen No.   |              | Peak Shear Stress (psf) |                       | Design Shear Stress (psf) | Horizontal Displacement (in) | Normal Stress (psf)     | Strain Rate (in/min) |
| 1              |              | 1820                    |                       |                           | 0.2600                       | 2000                    | 0.002                |
| 2              |              | 2660                    |                       |                           | 0.4000                       | 4000                    | 0.002                |
| 3              |              | 3860                    |                       |                           | 0.2600                       | 6000                    | 0.002                |
| Results        |              | Cohesion (psf)          |                       |                           | Friction ⬇ (deg)             |                         | Tan ⬇ (deg)          |
| Peak           |              | 740                     |                       |                           | 27.02                        |                         | 0.52                 |
| Design         |              |                         |                       |                           |                              |                         |                      |

Testing performed in general accordance with ASTM D3080.  
 NP = Nonplastic  
 NM = Not Measured



PROJECT NO.:  
20210045.001A

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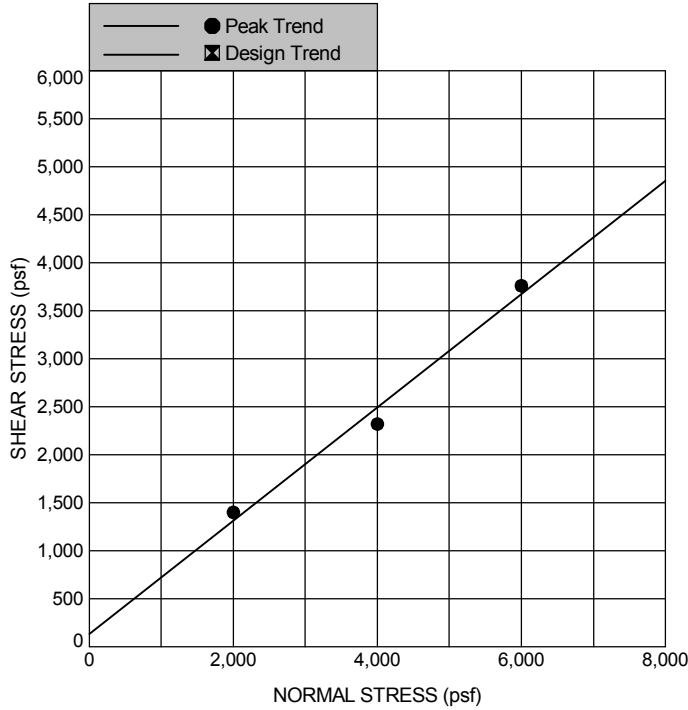
DATE: 6/4/2020

DIRECT SHEAR

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-5



| Exploration ID |              | Depth (ft.)             | Sample Description    |                           |                              |                         |                      |
|----------------|--------------|-------------------------|-----------------------|---------------------------|------------------------------|-------------------------|----------------------|
| B-8            |              | 2                       | SILT (ML)             |                           |                              |                         |                      |
| Passing #4 (%) |              | Passing #200 (%)        |                       | Liquid Limit              | Plastic Limit                | Plasticity Index        | Specific Gravity     |
| NM             |              | NM                      |                       | NM                        | NM                           | NM                      | 2.65                 |
| Initial        | Specimen No. | Water Content (%)       | Dry Unit Weight (pcf) | Saturation (%)            | Void Ratio                   | Area (in <sup>2</sup> ) | Height (in)          |
|                | 1            | 6.2                     | 98.6                  | 24.4                      | 0.677                        | 4.60                    | 0.96                 |
|                | 2            | 5.4                     | 96.6                  | 20.3                      | 0.711                        | 4.60                    | 0.96                 |
|                | 3            | 5.6                     | 101.3                 | 23.3                      | 0.633                        | 4.60                    | 0.96                 |
| At Test        | Specimen No. | Water Content (%)       | Dry Unit Weight (pcf) | Saturation (%)            | Void Ratio                   | Area (in <sup>2</sup> ) | Height (in)          |
|                | 1            | 22.4                    | 108.6                 |                           | 0.591                        | 4.60                    | 0.97                 |
|                | 2            | 22.2                    | 112.9                 |                           | 0.530                        | 4.60                    | 0.86                 |
|                | 3            | 20.9                    | 116.3                 |                           | 0.497                        | 4.60                    | 0.88                 |
|                |              |                         |                       |                           |                              |                         |                      |
| Specimen No.   |              | Peak Shear Stress (psf) |                       | Design Shear Stress (psf) | Horizontal Displacement (in) | Normal Stress (psf)     | Strain Rate (in/min) |
| 1              |              | 1400                    |                       |                           | 0.4000                       | 2000                    | 0.002                |
| 2              |              | 2320                    |                       |                           | 0.4000                       | 4000                    | 0.002                |
| 3              |              | 3760                    |                       |                           | 0.3800                       | 6000                    | 0.002                |
| Results        |              | Cohesion (psf)          |                       |                           | Friction ⬇ (deg)             |                         | Tan ⬇ (deg)          |
| Peak           |              | 133.33                  |                       |                           | 30.54                        |                         | 0.57                 |
| Design         |              |                         |                       |                           |                              |                         |                      |

Testing performed in general accordance with ASTM D3080.  
 NP = Nonplastic  
 NM = Not Measured



PROJECT NO.:  
20210045.001A

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DATE: 6/4/2020

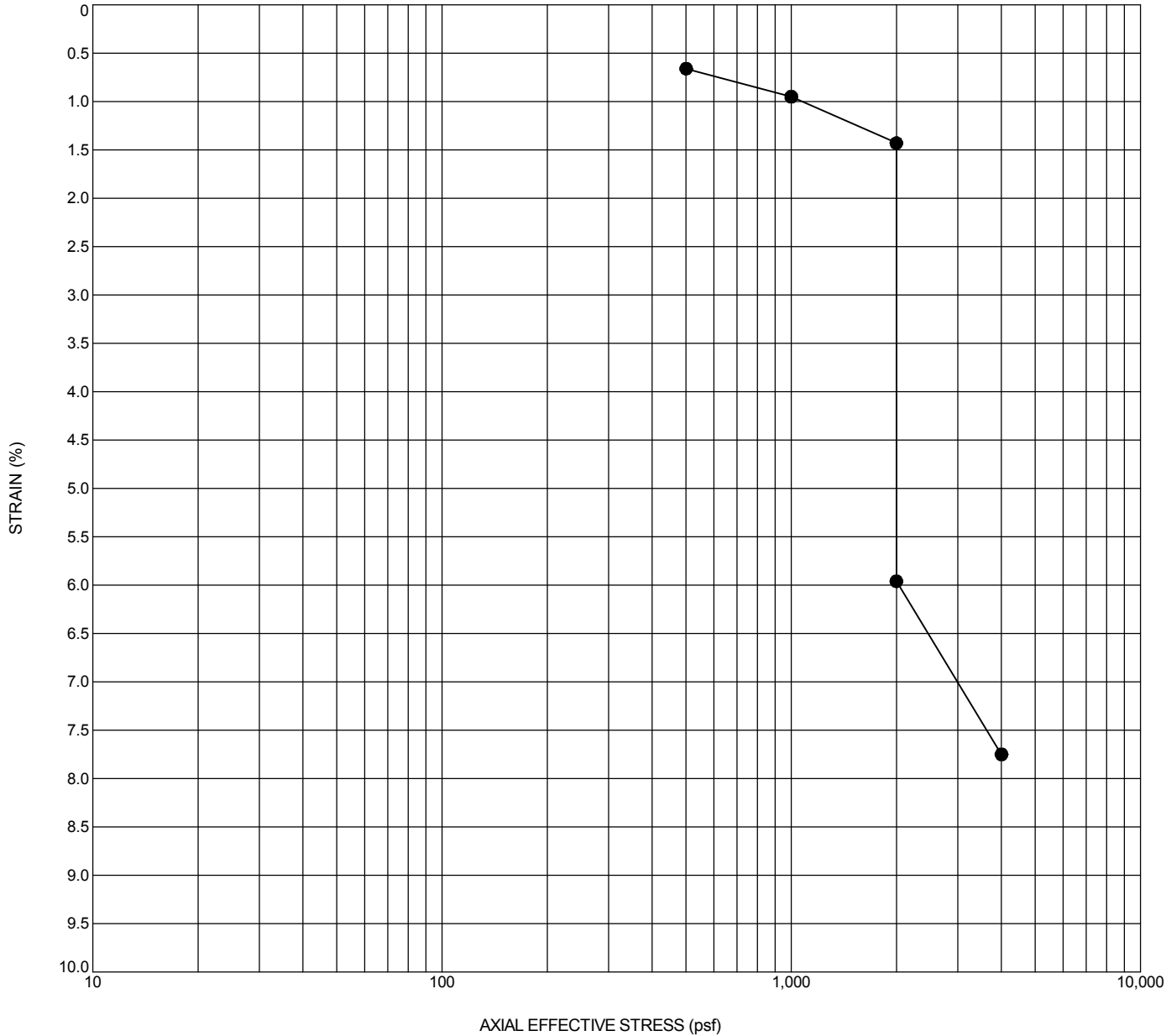
DIRECT SHEAR

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-6





| Exploration ID |                       | Depth (ft.)          | Sample Description |                   |                    |                    |                |            |                            |              |    |    |    |
|----------------|-----------------------|----------------------|--------------------|-------------------|--------------------|--------------------|----------------|------------|----------------------------|--------------|----|----|----|
| B-1            |                       | 6                    | SANDY SILT (ML)    |                   |                    |                    |                |            |                            |              |    |    |    |
|                | Sample Condition Type | Sample Diameter (mm) | Height (mm)        | Water Content (%) | Dry Unit Wt. (pcf) | Wet Unit Wt. (pcf) | Saturation (%) | Void Ratio | Specific Gravity (Assumed) | Passing #200 | LL | PL | PI |
| Initial        |                       | 2.4                  | 25.4               | 4.7               | 106.4              | 111.4              | 4.7            | 0.880      | 2.65                       | NM           | NM | NM | NM |
| Final          |                       | NM                   | 0.9                | 20.7              | 111.3              | 134.3              | 20.7           | 0.730      | 2.65                       |              |    |    |    |

Testing performed in general accordance with ASTM D2435 Method A.  
NP = Nonplastic  
NM = Not Measured



PROJECT NO.:  
20210045.001A

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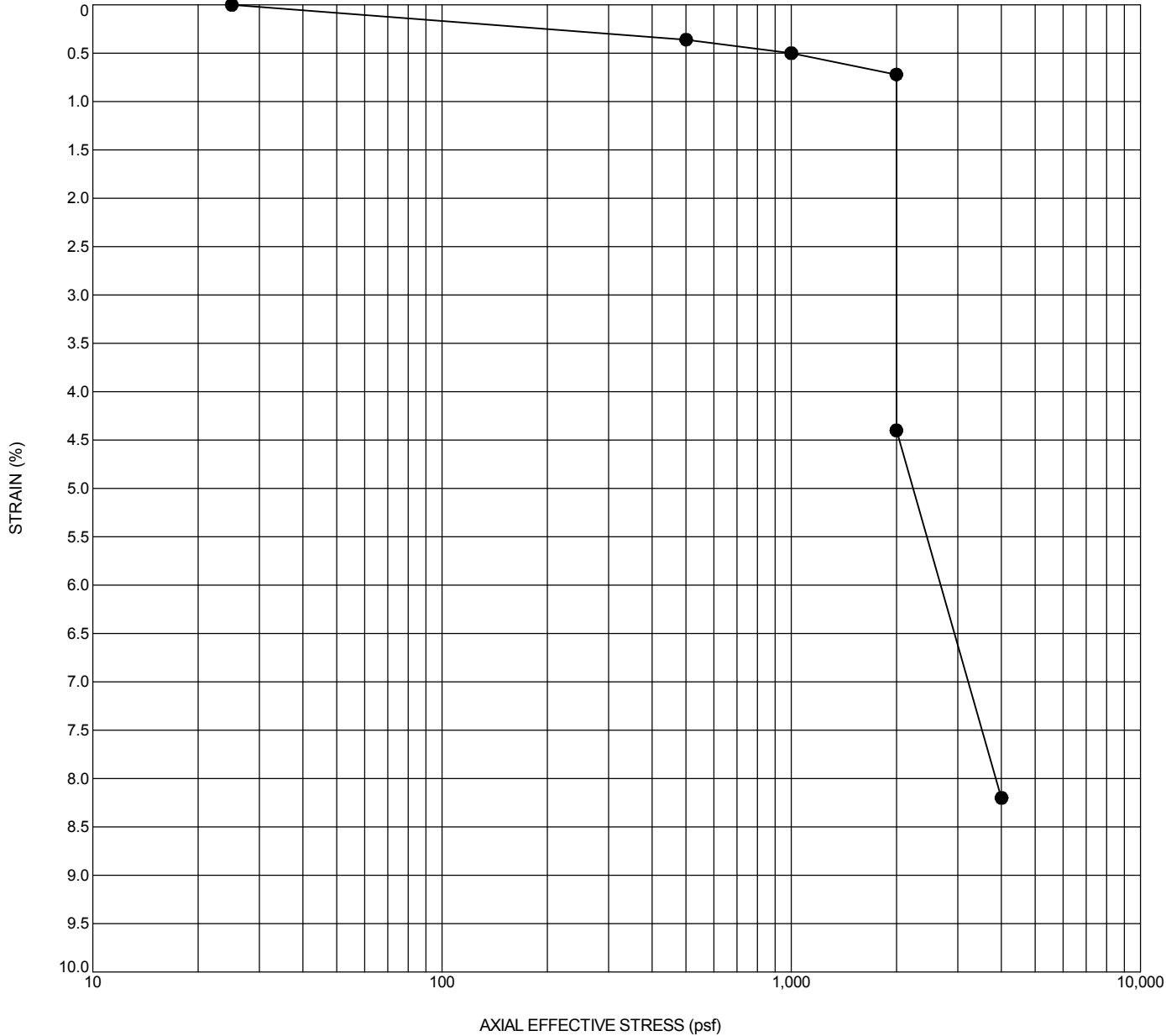
DATE: 6/4/2020

ONE DIMENSIONAL  
CONSOLIDATION TEST

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

B-7



| Exploration ID |                       | Depth (ft.)          |             | Sample Description |                    |                    |                |            |                            |              |    |    |    |
|----------------|-----------------------|----------------------|-------------|--------------------|--------------------|--------------------|----------------|------------|----------------------------|--------------|----|----|----|
| B-3            |                       | 1                    |             | SILTY SAND (SM)    |                    |                    |                |            |                            |              |    |    |    |
|                | Sample Condition Type | Sample Diameter (mm) | Height (mm) | Water Content (%)  | Dry Unit Wt. (pcf) | Wet Unit Wt. (pcf) | Saturation (%) | Void Ratio | Specific Gravity (Assumed) | Passing #200 | LL | PL | PI |
| Initial        |                       | 61.5                 | 25.4        | 6.9                | 96.8               | 103.4              | 25.7           | 0.710      | 2.65                       | NM           | NM | NM | NM |
| Final          |                       | 61.5                 | 25.4        | 21.2               | 104.3              | 126.4              | 97.0           | 0.570      | 2.65                       |              |    |    |    |

Testing performed in general accordance with ASTM D2435 Method A.  
NP = Nonplastic  
NM = Not Measured



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

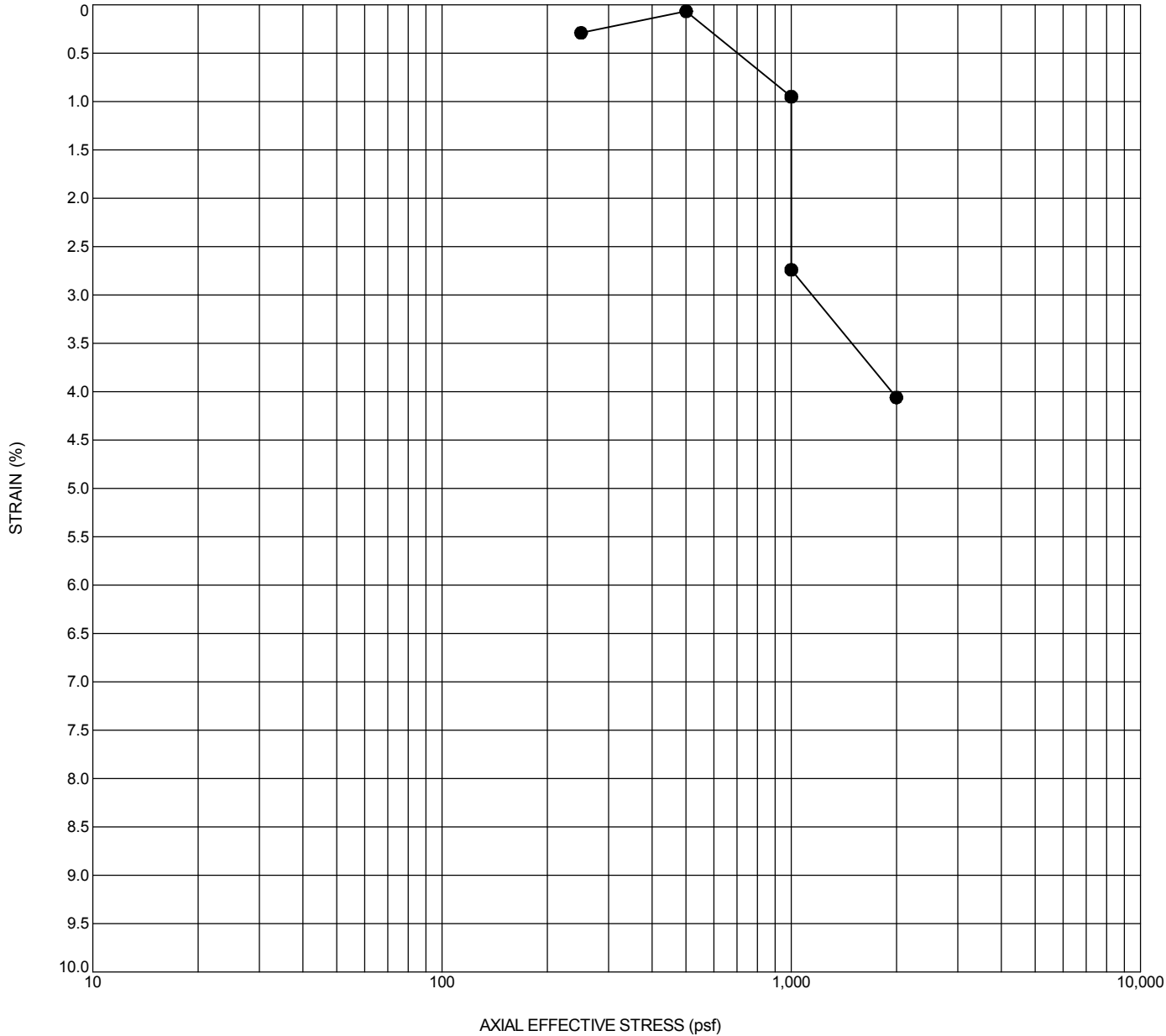
DATE: 6/4/2020

ONE DIMENSIONAL  
CONSOLIDATION TEST

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

B-8



| Exploration ID |                       | Depth (ft.)          |             | Sample Description |                    |                    |                |            |                  |              |    |    |    |
|----------------|-----------------------|----------------------|-------------|--------------------|--------------------|--------------------|----------------|------------|------------------|--------------|----|----|----|
| B-7            |                       | 7.5                  |             | SILTY SAND (SM)    |                    |                    |                |            |                  |              |    |    |    |
|                | Sample Condition Type | Sample Diameter (mm) | Height (mm) | Water Content (%)  | Dry Unit Wt. (pcf) | Wet Unit Wt. (pcf) | Saturation (%) | Void Ratio | Specific Gravity | Passing #200 | LL | PL | PI |
| Initial        |                       | NM                   | NM          | 7.9                | 97.8               | 105.5              | NM             | NM         | NM               | NM           | NM | NM | NM |
| Final          |                       | NM                   | NM          | 25.9               | 101.9              | 128.3              | NM             | NM         | NM               |              |    |    |    |

Testing performed in general accordance with ASTM D2435 Method A.  
NP = Nonplastic  
NM = Not Measured



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

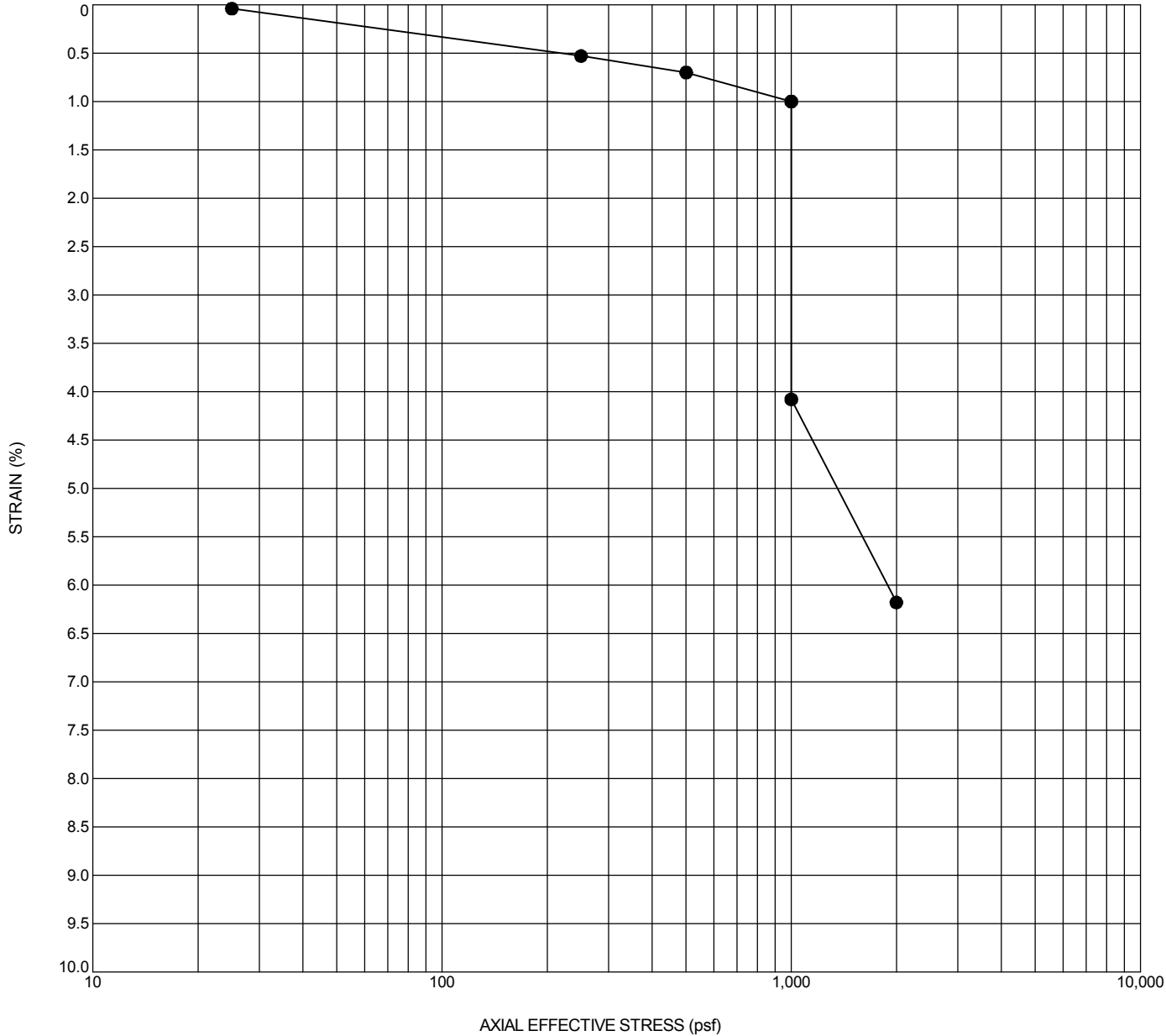
DATE: 6/4/2020

ONE DIMENSIONAL  
CONSOLIDATION TEST

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

B-9



| Exploration ID |                       | Depth (ft.)          | Sample Description |                   |                    |                    |                |            |                            |              |    |    |    |
|----------------|-----------------------|----------------------|--------------------|-------------------|--------------------|--------------------|----------------|------------|----------------------------|--------------|----|----|----|
| B-9            |                       | 2                    | SANDY SILT (ML)    |                   |                    |                    |                |            |                            |              |    |    |    |
|                | Sample Condition Type | Sample Diameter (mm) | Height (mm)        | Water Content (%) | Dry Unit Wt. (pcf) | Wet Unit Wt. (pcf) | Saturation (%) | Void Ratio | Specific Gravity (Assumed) | Passing #200 | LL | PL | PI |
| Initial        |                       | 61.5                 | 25.4               | 7.1               | 92.0               | 98.5               | 23.6           | 0.800      | 2.65                       | 57           | NM | NM | NM |
| Final          |                       | 61.5                 | 23.9               | 24.3              | 98.5               | 122.4              | 94.1           | 0.690      | 2.65                       |              |    |    |    |

Testing performed in general accordance with ASTM D2435 Method A.  
NP = Nonplastic  
NM = Not Measured



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

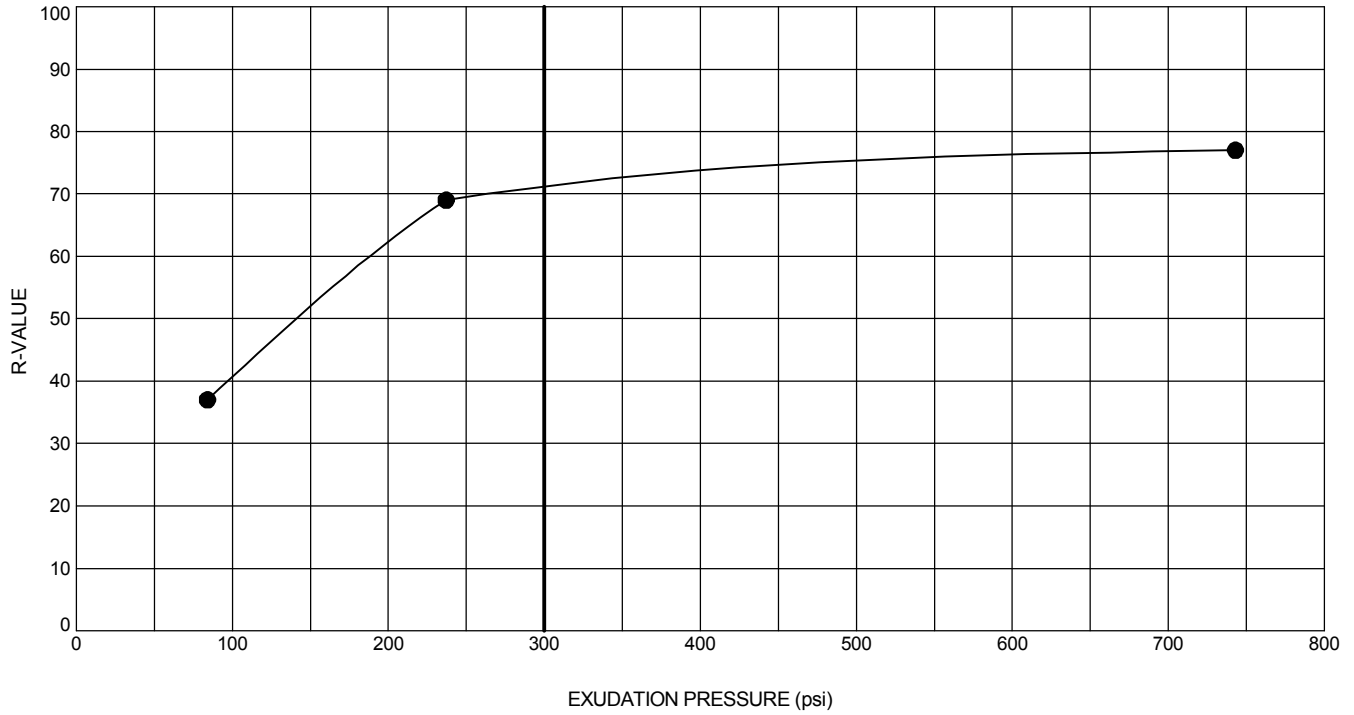
DATE: 6/4/2020

ONE DIMENSIONAL  
CONSOLIDATION TEST

PROPOSED HANFORD PLACE  
MEDICAL & MIXED-USE PROPERTY  
HANFORD, CALIFORNIA

APPENDIX

B-10



| Exploration ID | Depth (ft.)                  | Sample Description    |                          |                          | R-Value @ 300 psi<br>Exudation Pressure |
|----------------|------------------------------|-----------------------|--------------------------|--------------------------|-----------------------------------------|
| RV-1           | 0 - 3                        | SILTY SAND (SM)       |                          |                          | 70                                      |
| Specimen No.   | Moisture at Time of Test (%) | Dry Unit Weight (pcf) | Expansion Pressure (psi) | Exudation Pressure (psi) | Corrected<br>Resistance<br>Value        |
| 1              | 10.9                         | 118.3                 | 229                      | 743                      | 77                                      |
| 2              | 13.1                         | 116.3                 | 22                       | 84                       | 37                                      |
| 3              | 12.2                         | 116.1                 | 134                      | 237                      | 69                                      |

Testing performed in general accordance with ASTM D2844.



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

DATE: 6/4/2020

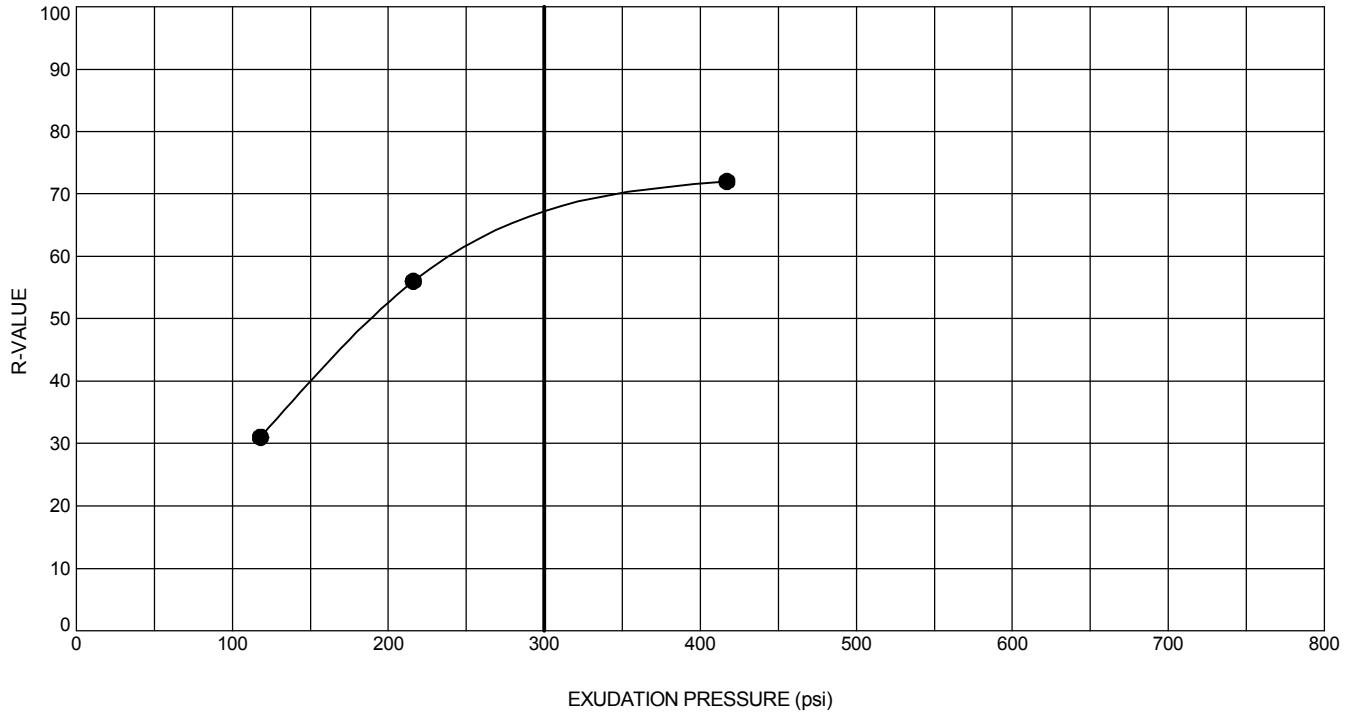
R-VALUE

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-11





| Exploration ID | Depth (ft.)                  | Sample Description    |                          |                          | R-Value @ 300 psi<br>Exudation Pressure |
|----------------|------------------------------|-----------------------|--------------------------|--------------------------|-----------------------------------------|
| RV-2           | 0 - 3                        | SILTY SAND (SM)       |                          |                          | 63                                      |
| Specimen No.   | Moisture at Time of Test (%) | Dry Unit Weight (pcf) | Expansion Pressure (psi) | Exudation Pressure (psi) | Corrected<br>Resistance<br>Value        |
| 1              | 10.3                         | 121.4                 | 178                      | 417                      | 72                                      |
| 2              | 12.0                         | 119.5                 | 4                        | 118                      | 31                                      |
| 3              | 11.1                         | 120.7                 | 48                       | 216                      | 56                                      |

Testing performed in general accordance with ASTM D2844.



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

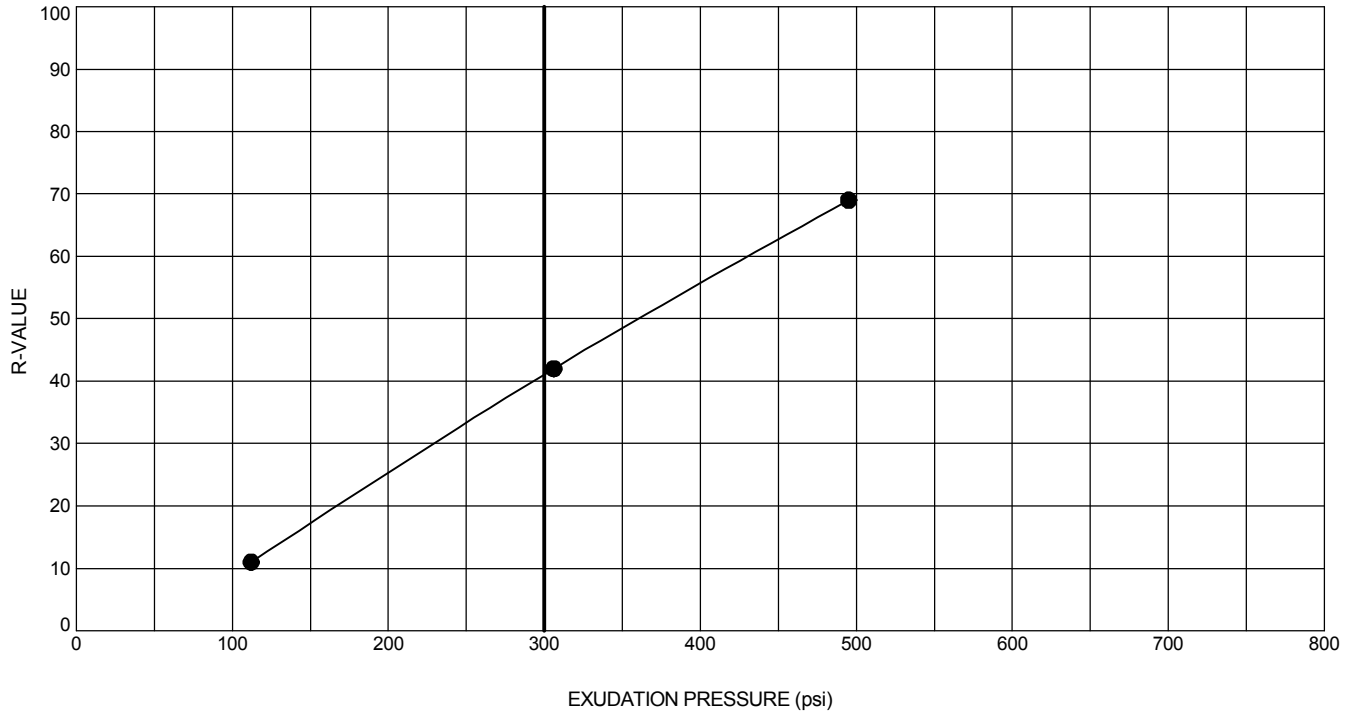
DATE: 6/4/2020

R-VALUE

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-12



| Exploration ID | Depth (ft.)                  | Sample Description    |                          |                          | R-Value @ 300 psi<br>Exudation Pressure |
|----------------|------------------------------|-----------------------|--------------------------|--------------------------|-----------------------------------------|
| RV-3           | 0 - 3                        | SANDY SILT (ML)       |                          |                          | 41                                      |
| Specimen No.   | Moisture at Time of Test (%) | Dry Unit Weight (pcf) | Expansion Pressure (psi) | Exudation Pressure (psi) | Corrected<br>Resistance<br>Value        |
| 1              | 13.7                         | 115.8                 | 26                       | 112                      | 11                                      |
| 2              | 12.0                         | 122.1                 | 186                      | 306                      | 42                                      |
| 3              | 11.1                         | 122.5                 | 325                      | 495                      | 69                                      |

Testing performed in general accordance with ASTM D2844.



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

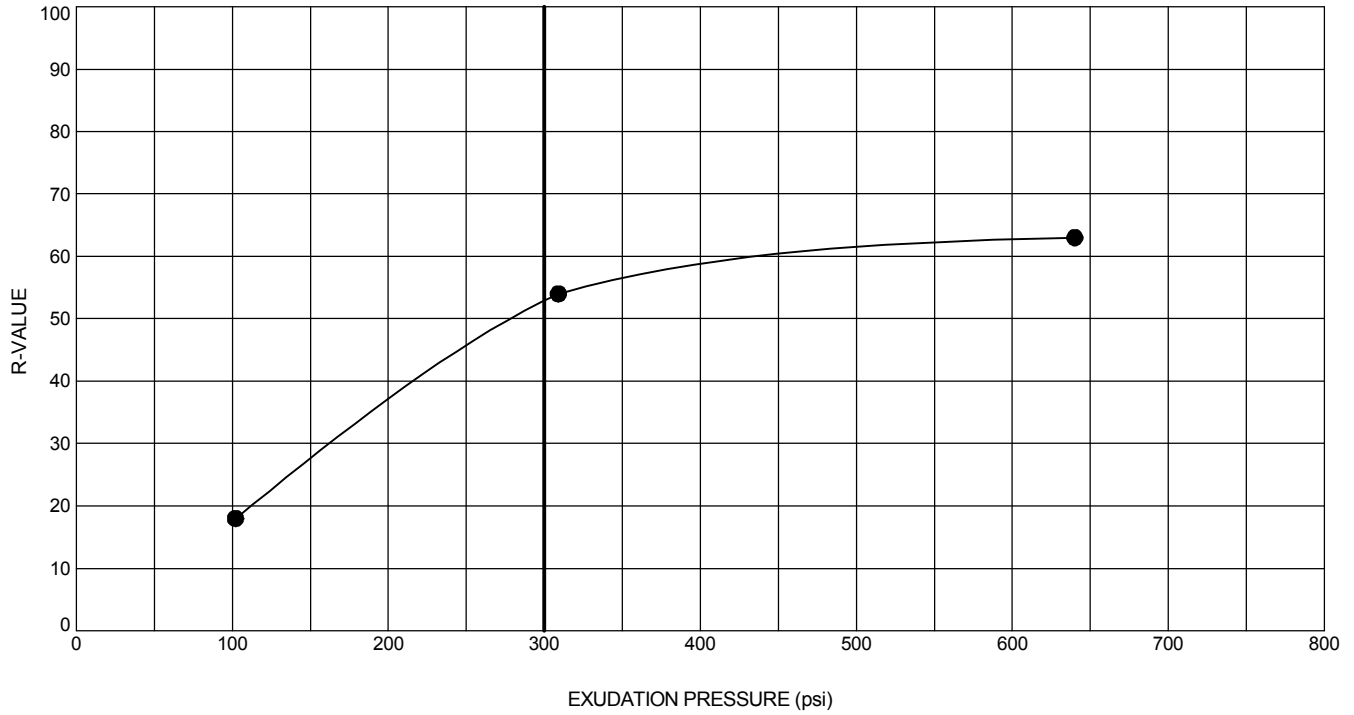
DATE: 6/4/2020

R-VALUE

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-13



| Exploration ID | Depth (ft.)                  | Sample Description    |                          |                          | R-Value @ 300 psi<br>Exudation Pressure |
|----------------|------------------------------|-----------------------|--------------------------|--------------------------|-----------------------------------------|
| RV-4           | 0 - 3                        | SANDY SILT (ML)       |                          |                          | 53                                      |
| Specimen No.   | Moisture at Time of Test (%) | Dry Unit Weight (pcf) | Expansion Pressure (psi) | Exudation Pressure (psi) | Corrected<br>Resistance<br>Value        |
| 1              | 11.8                         | 118.6                 | 450                      | 309                      | 54                                      |
| 2              | 13.6                         | 118.1                 | 147                      | 102                      | 18                                      |
| 3              | 11.4                         | 121.4                 | 688                      | 640                      | 63                                      |

Testing performed in general accordance with ASTM D2844.



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

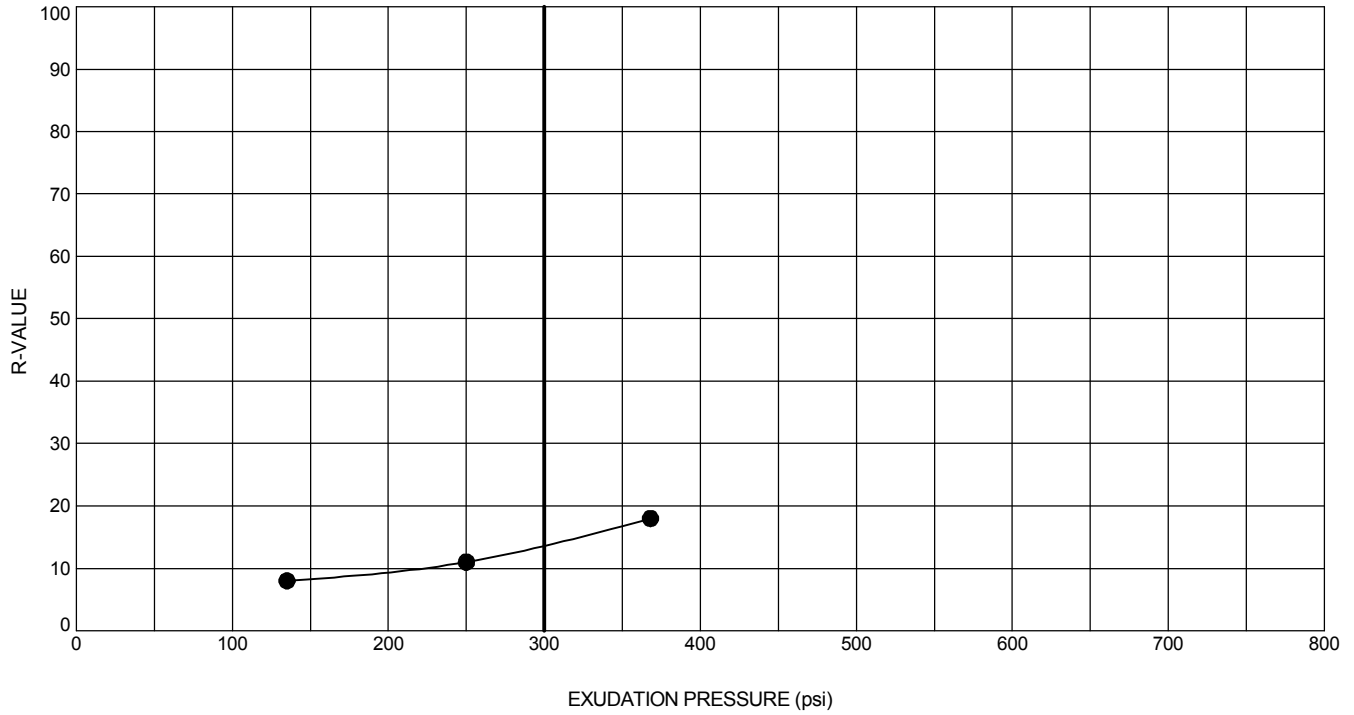
DATE: 6/4/2020

R-VALUE

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-14



| Exploration ID | Depth (ft.)                  | Sample Description    |                          |                          | R-Value @ 300 psi<br>Exudation Pressure |
|----------------|------------------------------|-----------------------|--------------------------|--------------------------|-----------------------------------------|
| RV-5           | 0 - 3                        | SILT (ML)             |                          |                          | 14                                      |
| Specimen No.   | Moisture at Time of Test (%) | Dry Unit Weight (pcf) | Expansion Pressure (psi) | Exudation Pressure (psi) | Corrected<br>Resistance<br>Value        |
| 1              | 13.8                         | 117.3                 | 208                      | 368                      | 18                                      |
| 2              | 14.7                         | 114.5                 | 121                      | 250                      | 11                                      |
| 3              | 15.5                         | 112.6                 | 61                       | 135                      | 8                                       |

Testing performed in general accordance with ASTM D2844.



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

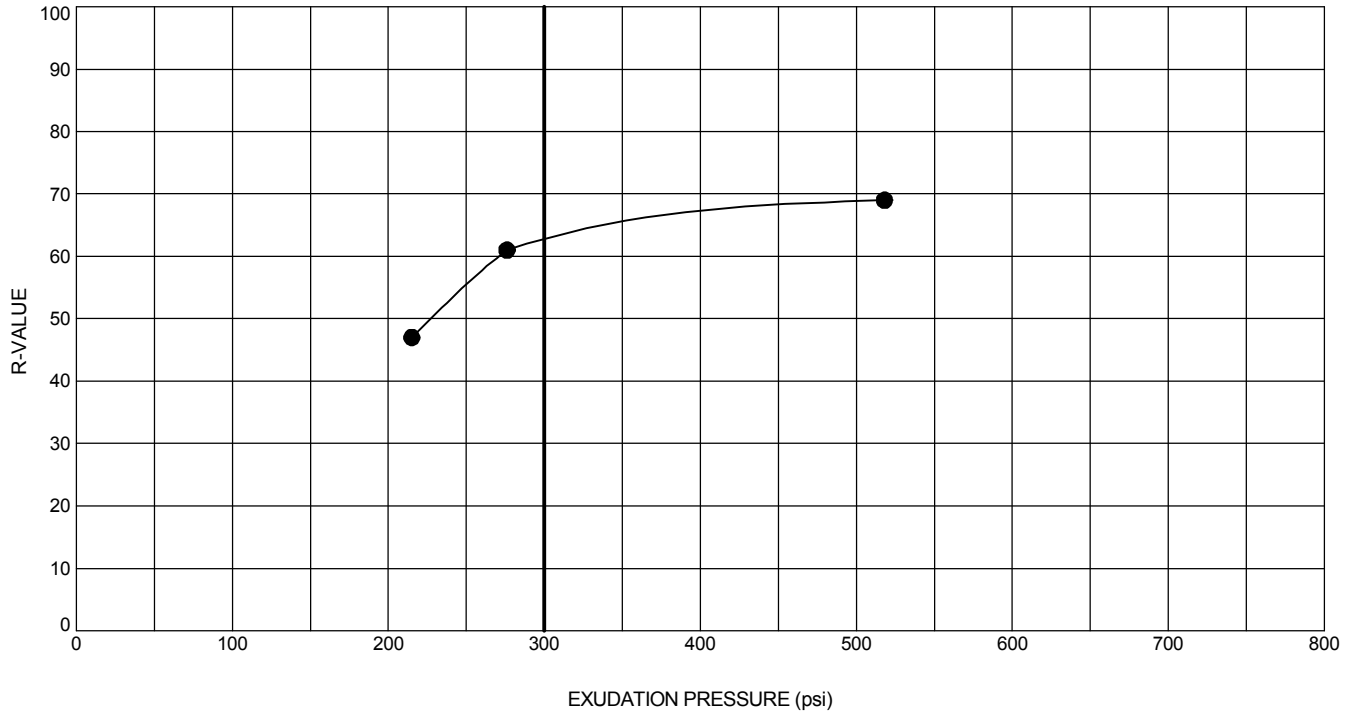
DATE: 6/4/2020

R-VALUE

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-15



| Exploration ID | Depth (ft.)                  | Sample Description    |                          |                          | R-Value @ 300 psi<br>Exudation Pressure |
|----------------|------------------------------|-----------------------|--------------------------|--------------------------|-----------------------------------------|
| RV-6           | 0 - 3                        | SILTY SAND (SM)       |                          |                          | 62                                      |
| Specimen No.   | Moisture at Time of Test (%) | Dry Unit Weight (pcf) | Expansion Pressure (psi) | Exudation Pressure (psi) | Corrected<br>Resistance<br>Value        |
| 1              | 12.6                         | 116.4                 | 178                      | 215                      | 47                                      |
| 2              | 11.8                         | 117.5                 | 368                      | 518                      | 69                                      |
| 3              | 12.2                         | 117.0                 | 255                      | 276                      | 61                                      |

Testing performed in general accordance with ASTM D2844.



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

DATE: 6/4/2020

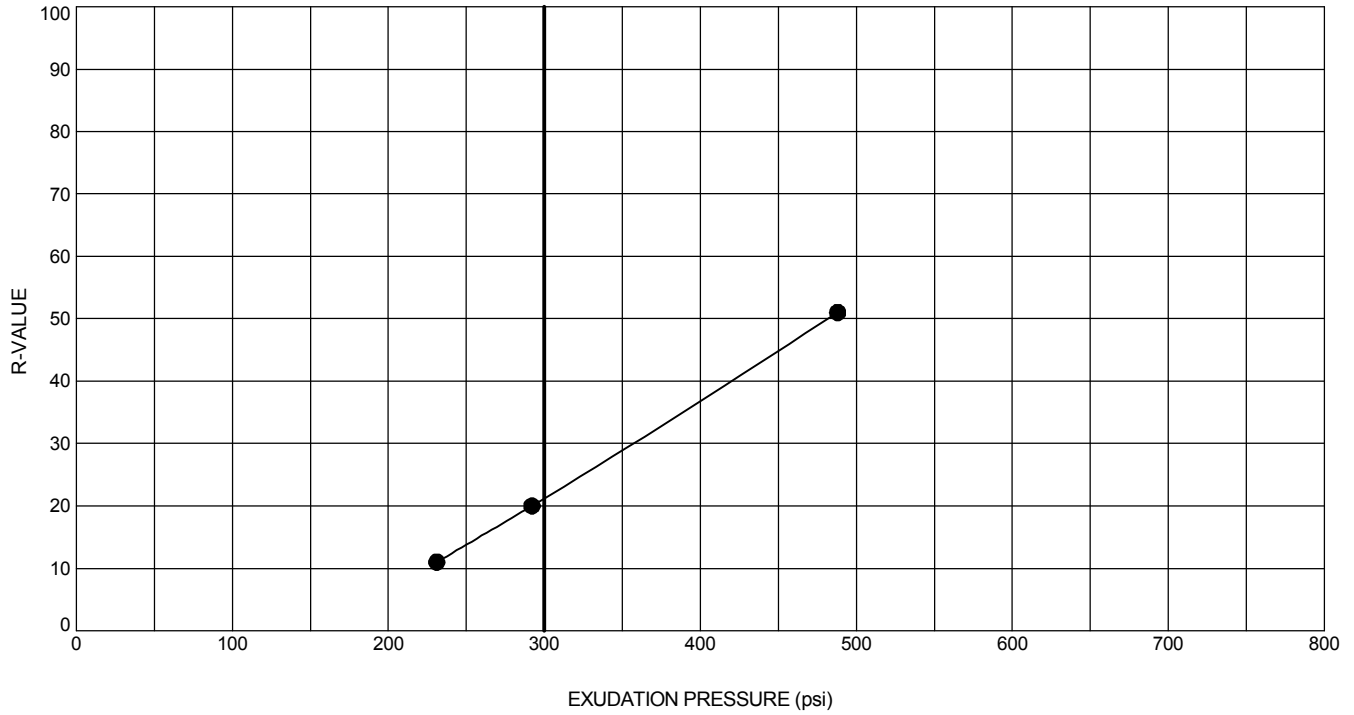
R-VALUE

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

B-16





| Exploration ID | Depth (ft.)                  | Sample Description    |                          |                          | R-Value @ 300 psi<br>Exudation Pressure |
|----------------|------------------------------|-----------------------|--------------------------|--------------------------|-----------------------------------------|
| RV-7           | 0 - 3                        | SANDY SILT (ML)       |                          |                          | 21                                      |
| Specimen No.   | Moisture at Time of Test (%) | Dry Unit Weight (pcf) | Expansion Pressure (psi) | Exudation Pressure (psi) | Corrected<br>Resistance<br>Value        |
| 1              | 14.0                         | 116.8                 | 104                      | 292                      | 20                                      |
| 2              | 14.8                         | 113.4                 | 39                       | 231                      | 11                                      |
| 3              | 13.1                         | 115.2                 | 299                      | 488                      | 51                                      |

Testing performed in general accordance with ASTM D2844.



PROJECT NO.:  
20210045.001A

DRAWN BY: AA

CHECKED BY: ES

DATE: 6/4/2020

R-VALUE

PROPOSED HANFORD PLACE  
 MEDICAL & MIXED-USE PROPERTY  
 HANFORD, CALIFORNIA

APPENDIX

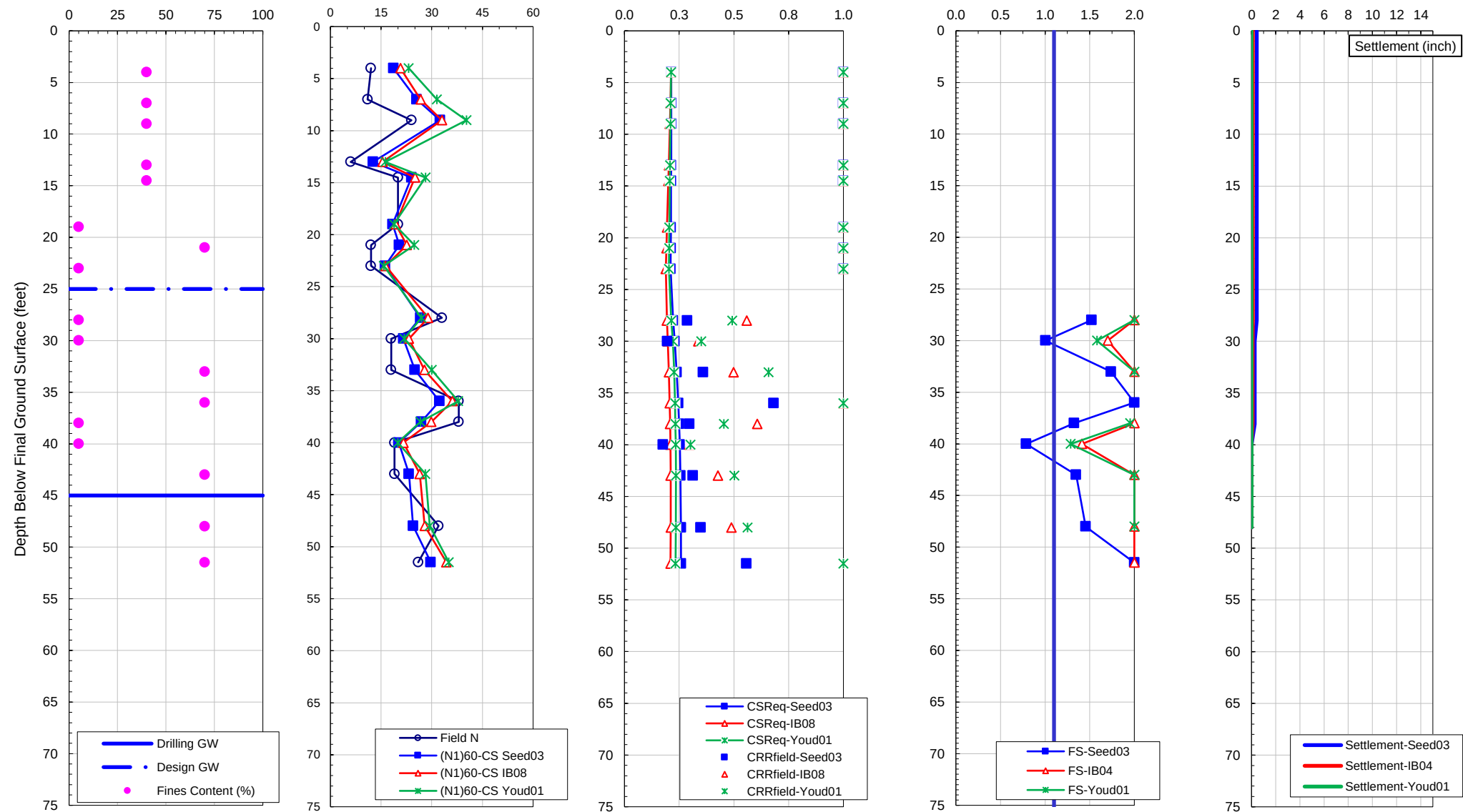
B-17

## APPENDIX C

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Liquefaction Analysis  
Dry Sand Settlement Analysis

Boring ID: **B-6 (5% in 50 yrs)**  $M_w = 6.2$   $PGA = 0.33g$  Groundwater Depth During Drilling (ft) = **45.0 ft** Existing Ground Elevation = **100.0 ft** Ana. by: A AhTye  
Design Groundwater Depth (ft) = **25.0 ft** Final Ground Elevation = **100.0 ft** Checked by: S. Plauson



1.  $(N_1)_{60-CS}$  capped at 60; 2. CRRfield = 1 for non-liquefiable soils; 3. FS is capped at 2.0 for liquefiable soils and not plotted for non-liquefiable soils including soils above G.W.T.



1330 Broadway, #1200  
Oakland, California 94612  
t: 510628 9000 f: 510 628 9009

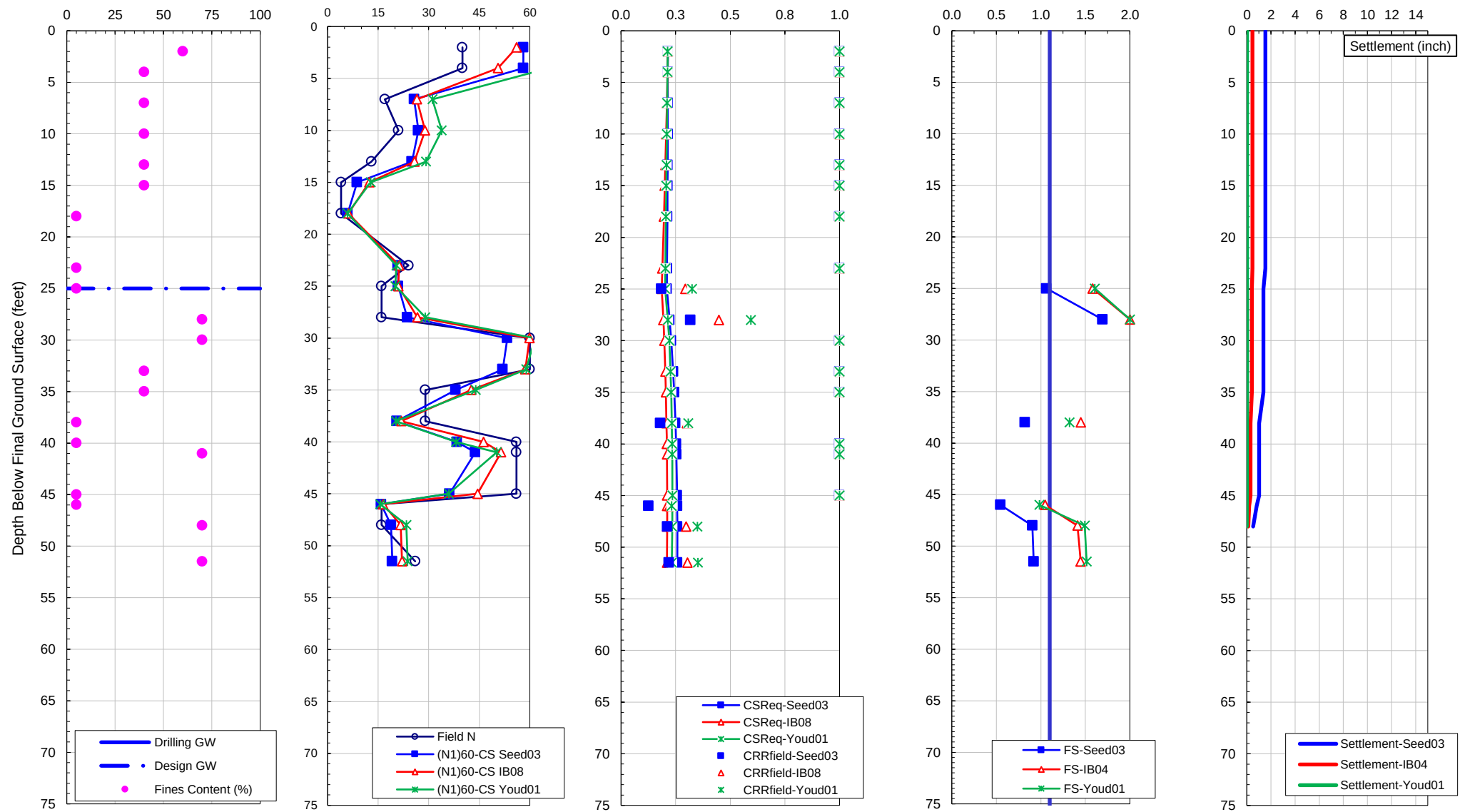
Project Name: Hanford Place  
Project No.: 20210045  
Project Location: Hanford, CA

# LIQUEFACTION ANALYSIS

Date 5/26/2020

**FIGURE A-1**

Boring ID: **B-7 (5% in 50 yrs)**  $M_w = 6.2$   $PGA = 0.33g$  Groundwater Depth During Drilling (ft) = **100.0 ft** Existing Ground Elevation = **100.0 ft** Ana. by: A AhTye  
 Design Groundwater Depth (ft) = **25.0 ft** Final Ground Elevation = **100.0 ft** Checked by: S. Plauson



1.  $(N_1)_{60-CS}$  capped at 60; 2. CRRfield = 1 for non-liquefiable soils; 3. FS is capped at 2.0 for liquefiable soils and not plotted for non-liquefiable soils including soils above G.W.T.



1330 Broadway, #1200  
 Oakland, California 94612  
 t: 510628 9000 f: 510 628 9009

Project Name: Hanford Place  
 Project No.: 20210045  
 Project Location: Hanford, CA

**LIQUEFACTION ANALYSIS**

Date 5/26/2020 **FIGURE A-1**

Seismic Settlement of Dry Sands  
Tokimatsu & Seed (1987)

M = 6.21 Moment Magnitude (Use Modal value)  
PHA = 0.33 g (Peak horizontal acceleration; use PG<sub>0</sub>)  
γ = 105 pcf (unit weight of soil)  
K<sub>0</sub> = 0.47 (at-rest coefficient)

Project No. 20210045  
Project Name Hanford Place  
Analysis by A. AhTye

|        |                                 |                      |                     |                               |                |                      |                       |                        |              |                                                                          |                                    |                                       |                         |                           |                        |                                                                  |                                                        | Results                                     |                                        |                                  |                                   |                                |                                   |                                  |
|--------|---------------------------------|----------------------|---------------------|-------------------------------|----------------|----------------------|-----------------------|------------------------|--------------|--------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------|---------------------------|------------------------|------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------------|----------------------------------------|----------------------------------|-----------------------------------|--------------------------------|-----------------------------------|----------------------------------|
| Boring | Depth at middle of sampler (ft) | Layer Thickness (ft) | Soil Classification | Anticipated Fines Content (%) | r <sub>d</sub> | σ <sub>v</sub> (psf) | σ <sub>v'</sub> (psf) | σ <sub>v''</sub> (tsf) | N (blows/ft) | SAMPLER TYPE<br>(1) SPT w/out liners<br>(2) SPT w/ liners (3) MC (4) CAL | Sampler Correction, C <sub>s</sub> | Overburden Correction, C <sub>N</sub> | Fine Content Correction | N <sub>t</sub> (blows/ft) | G <sub>max</sub> (psf) | Effective Shear Strain, γ <sub>sh</sub> (Geff/G <sub>max</sub> ) | Effective Shear Strain, γ <sub>sh</sub> (from Fig. 11) | Effective Shear Strain, γ <sub>sh</sub> (%) | Volumetric Strain (from Figure 13) (%) | Seismic Settlement for M7.5 (in) | Seismic Settlement for M5.25 (in) | Seismic Settlement for M6 (in) | Seismic Settlement for M6.75 (in) | Seismic Settlement for M8.5 (in) |
|        |                                 |                      |                     |                               |                |                      |                       |                        |              |                                                                          |                                    |                                       |                         |                           |                        |                                                                  |                                                        |                                             |                                        |                                  |                                   |                                |                                   |                                  |
| B-6    | 2                               | 4                    | SM                  | 40                            | 0.996          | 210                  | 135.8                 | 0.0679                 | 12           | 4                                                                        | 0.65                               | 1.70                                  | 3.2                     | 16                        | 592866                 | 7.56E-05                                                         | 1.2E-04                                                | 1.2E-02                                     | 0.0200                                 | 0.019                            | 0.01                              | 0.01                           | 0.02                              | 0.02                             |
|        | 5.5                             | 3                    | SM                  | 40                            | 0.988          | 577.5                | 373.45                | 0.186725               | 11           | 1                                                                        | 1.1                                | 1.70                                  | 3.2                     | 24                        | 1111278                | 1.10E-04                                                         | 3.0E-04                                                | 3.0E-02                                     | 0.0220                                 | 0.016                            | 0.01                              | 0.01                           | 0.01                              | 0.02                             |
|        | 8                               | 2                    | SM                  | 40                            | 0.983          | 840                  | 543.2                 | 0.2716                 | 24           | 4                                                                        | 0.65                               | 1.54                                  | 3.2                     | 27                        | 1403068                | 1.26E-04                                                         | 3.0E-04                                                | 3.0E-02                                     | 0.0200                                 | 0.010                            | 0.00                              | 0.01                           | 0.01                              | 0.01                             |
|        | 11                              | 4                    | SM                  | 40                            | 0.976          | 1155                 | 746.9                 | 0.37345                | 6            | 1                                                                        | 1.1                                | 1.32                                  | 3.2                     | 12                        | 1247366                | 1.94E-04                                                         | 4.0E-04                                                | 4.0E-02                                     | 0.0800                                 | 0.077                            | 0.03                              | 0.05                           | 0.07                              | 0.10                             |
|        | 13.75                           | 1.5                  | SM                  | 40                            | 0.970          | 1443.75              | 933.625               | 0.4668125              | 20           | 4                                                                        | 0.65                               | 1.18                                  | 3.2                     | 19                        | 1616265                | 1.86E-04                                                         | 4.0E-04                                                | 4.0E-02                                     | 0.0420                                 | 0.015                            | 0.01                              | 0.01                           | 0.01                              | 0.02                             |
|        | 16.75                           | 4.5                  | SP                  | 5                             | 0.964          | 1758.75              | 1137.325              | 0.5686625              | 20           | 4                                                                        | 0.65                               | 1.07                                  | 1.0                     | 15                        | 1658342                | 2.19E-04                                                         | 6.0E-04                                                | 6.0E-02                                     | 0.1000                                 | 0.108                            | 0.04                              | 0.06                           | 0.09                              | 0.14                             |
|        | 20                              | 2                    | ML                  | 70                            | 0.957          | 2100                 | 1358                  | 0.679                  | 12           | 1                                                                        | 1.1                                | 0.98                                  | 4.8                     | 18                        | 1920095                | 2.24E-04                                                         | 5.0E-04                                                | 5.0E-02                                     | 0.0600                                 | 0.029                            | 0.01                              | 0.02                           | 0.02                              | 0.04                             |
|        | 22                              | 2                    | SP                  | 5                             | 0.952          | 2310                 | 1493.8                | 0.7469                 | 12           | 1                                                                        | 1.1                                | 0.93                                  | 1.0                     | 13                        | 1830635                | 2.58E-04                                                         | 5.2E-04                                                | 5.2E-02                                     | 0.1000                                 | 0.048                            | 0.02                              | 0.03                           | 0.04                              | 0.06                             |
|        | 25.5                            | 5                    | SP                  | 5                             | 0.939          | 2677.5               | 1731.45               | 0.865725               | 33           | 4                                                                        | 0.65                               | 0.86                                  | 1.0                     | 20                        | 2241470                | 2.41E-04                                                         | 5.0E-04                                                | 5.0E-02                                     | 0.0500                                 | 0.060                            | 0.02                              | 0.04                           | 0.05                              | 0.08                             |
|        | 29                              | 2                    | SP                  | 5                             | 0.924          | 3045                 | 1969.1                | 0.98455                | 18           | 1                                                                        | 1.1                                | 0.81                                  | 1.0                     | 17                        | 2284078                | 2.64E-04                                                         | 4.8E-04                                                | 4.8E-02                                     | 0.0600                                 | 0.029                            | 0.01                              | 0.02                           | 0.02                              | 0.04                             |
|        | 31.5                            | 3                    | CL-ML               | 70                            | 0.911          | 3307.5               | 2138.85               | 1.069425               | 18           | 1                                                                        | 1.1                                | 0.78                                  | 4.8                     | 20                        | 2518920                | 2.57E-04                                                         | 4.8E-04                                                | 4.8E-02                                     | 0.0500                                 | 0.036                            | 0.01                              | 0.02                           | 0.03                              | 0.05                             |
|        | 34.5                            | 3                    | CL-ML               | 70                            | 0.893          | 3622.5               | 2342.55               | 1.171275               | 38           | 4                                                                        | 0.65                               | 0.74                                  | 4.8                     | 23                        | 2758949                | 2.52E-04                                                         | 5.0E-04                                                | 5.0E-02                                     | 0.0480                                 | 0.035                            | 0.01                              | 0.02                           | 0.03                              | 0.04                             |
|        | 37                              | 2                    | SP                  | 5                             | 0.878          | 3885                 | 2512.3                | 1.25615                | 38           | 4                                                                        | 0.65                               | 0.72                                  | 1.0                     | 19                        | 2661855                | 2.75E-04                                                         | 5.0E-04                                                | 5.0E-02                                     | 0.0500                                 | 0.024                            | 0.01                              | 0.01                           | 0.02                              | 0.03                             |
|        | 39                              | 2                    | SP                  | 5                             | 0.866          | 4095                 | 2648.1                | 1.32405                | 19           | 1                                                                        | 1.1                                | 0.70                                  | 1.0                     | 16                        | 2571947                | 2.96E-04                                                         | 6.0E-04                                                | 6.0E-02                                     | 0.0900                                 | 0.043                            | 0.02                              | 0.03                           | 0.04                              | 0.05                             |
|        | 41.5                            | 3                    | CL-ML               | 70                            | 0.845          | 4357.5               | 2817.85               | 1.408925               | 19           | 1                                                                        | 1.1                                | 0.68                                  | 4.8                     | 19                        | 2830935                | 2.79E-04                                                         | 6.0E-04                                                | 6.0E-02                                     | 0.0700                                 | 0.050                            | 0.02                              | 0.03                           | 0.04                              | 0.06                             |
|        | 45.5                            | 5                    | CL-ML               | 70                            | 0.805          | 4777.5               | 3089.45               | 1.544725               | 32           | 4                                                                        | 0.65                               | 0.65                                  | 4.8                     | 18                        | 2927213                | 2.82E-04                                                         | 6.0E-04                                                | 6.0E-02                                     | 0.0700                                 | 0.084                            | 0.03                              | 0.05                           | 0.07                              | 0.11                             |
|        | 49.75                           | 3.5                  | CL-ML               | 70                            | 0.763          | 5223.75              | 3378.025              | 1.6890125              | 26           | 1                                                                        | 1.1                                | 0.62                                  | 4.8                     | 22                        | 3281460                | 2.60E-04                                                         | 5.0E-04                                                | 5.0E-02                                     | 0.0480                                 | 0.040                            | 0.02                              | 0.02                           | 0.03                              | 0.05                             |

0.723      0.29      0.43      0.61      0.90  
MAG 6.21      0.4841688  
Double the value for bi-directional shaking  
Select= 1/4 for M 6.21  
6      6.75

↑  
(use to read Fig. 11)

↑  
(use to read Fig. 13)

↑  
(use to read Fig. 11)

↑  
(use to read Fig. 13)



Seismic Settlement of Dry Sands  
Tokimatsu & Seed (1987)

M = 6.21 Moment Magnitude (Use Modal value)  
PHA = 0.33 g (Peak horizontal acceleration; use PG<sub>0</sub>)  
γ = 105 pcf (unit weight of soil)  
K<sub>0</sub> = 0.47 (at-rest coefficient)

Project No. 20210045  
Project Name Hanford Place  
Analysis by A. AhTye

|        |                                 |                      |                     |                               |                |                      |                       |                       |              |                                                                          |                                    |                                       |                         |                           |            |                                                     |                                                        | Results                                     |                                        |                                  |                                   |                                |                                   |                                  |
|--------|---------------------------------|----------------------|---------------------|-------------------------------|----------------|----------------------|-----------------------|-----------------------|--------------|--------------------------------------------------------------------------|------------------------------------|---------------------------------------|-------------------------|---------------------------|------------|-----------------------------------------------------|--------------------------------------------------------|---------------------------------------------|----------------------------------------|----------------------------------|-----------------------------------|--------------------------------|-----------------------------------|----------------------------------|
| Boring | Depth at middle of sampler (ft) | Layer Thickness (ft) | Soil Classification | Anticipated Fines Content (%) | r <sub>d</sub> | σ <sub>v</sub> (psf) | σ' <sub>v</sub> (psf) | σ' <sub>v</sub> (tsf) | N (blows/ft) | SAMPLER TYPE<br>(1) SPT w/out liners<br>(2) SPT w/ liners (3) MC (4) CAL | Sampler Correction, C <sub>s</sub> | Overburden Correction, C <sub>N</sub> | Fine Content Correction | N <sub>1</sub> (blows/ft) | Gmax (psf) | Effective Shear Strain, γ <sub>sh</sub> (Geff/Gmax) | Effective Shear Strain, γ <sub>sh</sub> (from Fig. 11) | Effective Shear Strain, γ <sub>sh</sub> (%) | Volumetric Strain (from Figure 13) (%) | Seismic Settlement for M7.5 (in) | Seismic Settlement for M5.25 (in) | Seismic Settlement for M6 (in) | Seismic Settlement for M6.75 (in) | Seismic Settlement for M8.5 (in) |
| B-7    | 1                               | 2                    | ML                  | 60                            | 0.998          | 105                  | 67.9                  | 0.03395               | 40           | 4                                                                        | 0.65                               | 1.70                                  | 4.4                     | 49                        | 601419     | 3.74E-05                                            | 5.0E-05                                                | 5.0E-03                                     | 0.0014                                 | 0.001                            | 0.00                              | 0.00                           | 0.00                              | 0.00                             |
|        | 3                               | 2                    | SM                  | 40                            | 0.993          | 315                  | 203.7                 | 0.10185               | 40           | 4                                                                        | 0.65                               | 1.70                                  | 3.2                     | 47                        | 1033043    | 6.50E-05                                            | 8.5E-05                                                | 8.5E-03                                     | 0.0015                                 | 0.001                            | 0.00                              | 0.00                           | 0.00                              | 0.00                             |
|        | 5.5                             | 3                    | SM                  | 40                            | 0.988          | 577.5                | 373.45                | 0.186725              | 17           | 4                                                                        | 0.65                               | 1.70                                  | 3.2                     | 22                        | 1082734    | 1.13E-04                                            | 2.0E-04                                                | 2.0E-02                                     | 0.0180                                 | 0.013                            | 0.01                              | 0.01                           | 0.01                              | 0.02                             |
|        | 8.5                             | 3                    | SM                  | 40                            | 0.982          | 892.5                | 577.15                | 0.288575              | 21           | 4                                                                        | 0.65                               | 1.50                                  | 3.2                     | 24                        | 1378851    | 1.36E-04                                            | 2.1E-04                                                | 2.1E-02                                     | 0.0150                                 | 0.011                            | 0.00                              | 0.01                           | 0.01                              | 0.01                             |
|        | 11.5                            | 3                    | SM                  | 40                            | 0.975          | 1207.5               | 780.85                | 0.390425              | 13           | 1                                                                        | 1.1                                | 1.29                                  | 3.2                     | 22                        | 1556529    | 1.62E-04                                            | 2.8E-04                                                | 2.8E-02                                     | 0.0220                                 | 0.016                            | 0.01                              | 0.01                           | 0.01                              | 0.02                             |
|        | 14                              | 2                    | SM                  | 40                            | 0.970          | 1470                 | 950.6                 | 0.4753                | 4            | 1                                                                        | 1.1                                | 1.17                                  | 3.2                     | 8                         | 1250115    | 2.45E-04                                            | 7.0E-04                                                | 7.0E-02                                     | 0.2000                                 | 0.096                            | 0.04                              | 0.06                           | 0.08                              | 0.12                             |
|        | 16.5                            | 3                    | SP                  | 5                             | 0.964          | 1732.5               | 1120.35               | 0.560175              | 4            | 1                                                                        | 1.1                                | 1.07                                  | 1.0                     | 6                         | 1197738    | 2.99E-04                                            | 1.0E-03                                                | 1.0E-01                                     | 0.4000                                 | 0.288                            | 0.12                              | 0.17                           | 0.24                              | 0.36                             |
|        | 20.5                            | 5                    | SP                  | 5                             | 0.955          | 2152.5               | 1391.95               | 0.695975              | 24           | 4                                                                        | 0.65                               | 0.96                                  | 1.0                     | 16                        | 1881705    | 2.34E-04                                            | 5.5E-04                                                | 5.5E-02                                     | 0.0800                                 | 0.096                            | 0.04                              | 0.06                           | 0.08                              | 0.12                             |
|        | 24                              | 2                    | SP                  | 5                             | 0.946          | 2520                 | 1629.6                | 0.8148                | 16           | 1                                                                        | 1.1                                | 0.89                                  | 1.0                     | 17                        | 2062830    | 2.48E-04                                            | 5.0E-04                                                | 5.0E-02                                     | 0.0700                                 | 0.034                            | 0.01                              | 0.02                           | 0.03                              | 0.04                             |
|        | 26.5                            | 3                    | CL                  | 70                            | 0.935          | 2782.5               | 1799.35               | 0.899675              | 16           | 1                                                                        | 1.1                                | 0.85                                  | 4.8                     | 20                        | 2292102    | 2.43E-04                                            | 5.0E-04                                                | 5.0E-02                                     | 0.0500                                 | 0.036                            | 0.01                              | 0.02                           | 0.03                              | 0.05                             |
|        | 29                              | 2                    | CL                  | 70                            | 0.924          | 3045                 | 1969.1                | 0.98455               | 60           | 4                                                                        | 0.65                               | 0.81                                  | 4.8                     | 36                        | 2941437    | 2.05E-04                                            | 3.2E-04                                                | 3.2E-02                                     | 0.0220                                 | 0.011                            | 0.00                              | 0.01                           | 0.01                              | 0.01                             |
|        | 31.5                            | 3                    | SM                  | 40                            | 0.911          | 3307.5               | 2138.85               | 1.069425              | 60           | 4                                                                        | 0.65                               | 0.78                                  | 3.2                     | 34                        | 2982532    | 2.17E-04                                            | 3.5E-04                                                | 3.5E-02                                     | 0.0160                                 | 0.012                            | 0.00                              | 0.01                           | 0.01                              | 0.01                             |
|        | 34                              | 2                    | SM                  | 40                            | 0.896          | 3570                 | 2308.6                | 1.1543                | 29           | 1                                                                        | 1.1                                | 0.75                                  | 3.2                     | 27                        | 2885595    | 2.38E-04                                            | 4.5E-04                                                | 4.5E-02                                     | 0.0330                                 | 0.016                            | 0.01                              | 0.01                           | 0.01                              | 0.02                             |
|        | 36.5                            | 3                    | SP                  | 5                             | 0.881          | 3832.5               | 2478.35               | 1.239175              | 29           | 4                                                                        | 0.65                               | 0.72                                  | 1.0                     | 15                        | 2434437    | 2.97E-04                                            | 6.0E-04                                                | 6.0E-02                                     | 0.1000                                 | 0.072                            | 0.03                              | 0.04                           | 0.06                              | 0.09                             |
|        | 39                              | 2                    | SP                  | 5                             | 0.866          | 4095                 | 2648.1                | 1.32405               | 56           | 4                                                                        | 0.65                               | 0.70                                  | 1.0                     | 26                        | 3066023    | 2.48E-04                                            | 4.4E-04                                                | 4.4E-02                                     | 0.0320                                 | 0.015                            | 0.01                              | 0.01                           | 0.01                              | 0.02                             |
|        | 40.5                            | 1                    | CL                  | 70                            | 0.855          | 4252.5               | 2749.95               | 1.374975              | 56           | 4                                                                        | 0.65                               | 0.69                                  | 4.8                     | 30                        | 3250254    | 2.40E-04                                            | 4.5E-04                                                | 4.5E-02                                     | 0.0280                                 | 0.007                            | 0.00                              | 0.00                           | 0.01                              | 0.01                             |
|        | 43                              | 4                    | SP                  | 5                             | 0.830          | 4515                 | 2919.7                | 1.45985               | 56           | 4                                                                        | 0.65                               | 0.67                                  | 1.0                     | 25                        | 3169449    | 2.54E-04                                            | 4.5E-04                                                | 4.5E-02                                     | 0.0320                                 | 0.031                            | 0.01                              | 0.02                           | 0.03                              | 0.04                             |
|        | 45.5                            | 1                    | SP                  | 5                             | 0.805          | 4777.5               | 3089.45               | 1.544725              | 16           | 1                                                                        | 1.1                                | 0.65                                  | 1.0                     | 12                        | 2572161    | 3.21E-04                                            | 7.0E-04                                                | 7.0E-02                                     | 0.1300                                 | 0.031                            | 0.01                              | 0.02                           | 0.03                              | 0.04                             |
|        | 47                              | 2                    | CL                  | 70                            | 0.790          | 4935                 | 3191.3                | 1.59565               | 16           | 1                                                                        | 1.1                                | 0.64                                  | 4.8                     | 16                        | 2847252    | 2.94E-04                                            | 5.8E-04                                                | 5.8E-02                                     | 0.0800                                 | 0.038                            | 0.02                              | 0.02                           | 0.03                              | 0.05                             |
|        | 49.75                           | 3.5                  | CL                  | 70                            | 0.763          | 5223.75              | 3378.025              | 1.6890125             | 26           | 4                                                                        | 0.65                               | 0.62                                  | 4.8                     | 15                        | 2883048    | 2.96E-04                                            | 5.5E-04                                                | 5.5E-02                                     | 0.0800                                 | 0.067                            | 0.03                              | 0.04                           | 0.06                              | 0.08                             |

0.890 0.36 0.53 0.76 1.11  
MAG 6.21 0.59637504  
Double the value for bi-directional shaking  
Select= 1/4 for M 6.21  
6 6.75

↑  
(use to read Fig. 11)

↑  
(use to read Fig. 13)

↑  
(use to read Fig. 11)

↑  
(use to read Fig. 13)

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## APPENDIX E

### ACOUSTICAL ANALYSIS

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**ACOUSTICAL ANALYSIS**

**HANFORD PLACE  
HANFORD, CALIFORNIA**

**WJVA Report No. 20-016**

**PREPARED FOR**

**THE HANFORD GROUP/EPIC MANAGEMENT GROUP  
4405 MARGARITA ROAD, SUITE 100  
TEMECULA, CALIFORNIA 92592**

**PREPARED BY**

**WJV ACOUSTICS, INC.  
VISALIA, CALIFORNIA**



**MAY 12, 2021**

# **1. INTRODUCTION**

## **Project Description:**

The proposed project would develop a medical and mixed-use development and would construct fifteen (15) buildings consisting of medical outpatient clinic services, hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements.

The proposed project would include the following: a 22,525-square-foot ambulatory surgery center; a 12,445-square-foot specialty clinic; two 12,445-square-foot medical office buildings; a 12,445-square-foot psychiatric health facility; a 10,000-square-foot, a four-story 105-room hotel with a conference center and pool; a 35,000-square-foot nursing college; four 15,55-square-foot strip retail buildings; two 15,000-square-foot retail/drive-through/medical commercial buildings; a 54,611-square-foot skilled nursing facility; a 34,480-square-foot memory care facility; a three-story 90-unit multi-family apartment; two 11,000 medical/commercial buildings; and a 5-acre bio infiltration basin.

## **Environmental Noise Assessment:**

This environmental noise assessment has been prepared to determine if significant noise impacts will be produced by the project and to describe mitigation measures for noise if significant impacts are determined. The environmental noise assessment, prepared by WJV Acoustics, Inc. (WJVA), is based upon the project Site Plan provided by the applicant (Figure 1), traffic data provided by VRPA Technologies, Inc. and a project site visit on May 5-6, 2021. Revisions to the Site Plan, project traffic information or other project-related information available to WJVA at the time the analysis was prepared may require a reevaluation of the findings and/or recommendations of the report.

Appendix A provides definitions of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported in this analysis are A-weighted sound pressure levels in decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighted sound levels, as they correlate well with public reaction to noise. Appendix B provides examples of sound levels for reference.



## **2. THRESHOLDS OF SIGNIFICANCE**

The CEQA Guidelines apply the following questions for the assessment of significant noise impacts for a project:

- a. Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels?
- c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

### **a. Noise Level Standards**

#### CITY OF HANFORD

##### **General Plan**

The City of Hanford Noise Element of the General Plan<sup>1</sup> (adopted April 2017) provides generalized Noise Goals and Policies for various noise sources and land uses, related to development within the City. These noise goals and policies are provided below.

##### **Noise Goals**

- Goal H7: Protection from the harmful and annoying effect of excessive noise.
- Goal H8: Protection of the City's economic base by preventing incompatible land uses from encroaching upon existing or planned noise-producing uses.

##### **Major Noise Sources**

- Policy H39 Aircraft Noise: Evaluate proposed development proposals against the land use policies of the Kings County Airport Land Use Compatibility Plan.
- Policy H40 Ground Transportation Noise: Limit the effects of vehicle noise generation by designating truck routes, limiting vehicle speeds, standards relating to vehicle noise emission levels and muffler systems.
- Policy H41 Interior Noise Exposure: Adopt State Noise Insulation Standards (California Code of Regulations, Title 24) and Chapter 35 of the Uniform Building Code (UBC)

concerning interior noise exposure for new single, multi-family housing, hotels and motels.

- Policy H42 Noise Evaluation for New Development: Evaluate proposed development proposals against existing and future noise levels from ground transportation noise sources.
- Policy H43 Non-Transportation Noise: Mitigate noise created by non-transportation noise sources so as not to exceed the maximum allowable interior and exterior noise level standards.

### **Noise Exposure**

- Policy H45 Minimizing Noise for Residences in Mixed-use Developments: Require mixed-use projects to minimize noise exposure within the indoor areas of residential areas through design and construction techniques such as separating residential space from mechanical equipment, loading bays, and parking lots, and through management and operating procedures.

The 2017 General Plan does not provide specific noise standards applicable to development projects. Therefore, WJVA consulted with City staff who provided the noise level standards from the City's 2002 General Plan. The standards provided in the 2002 General Plan are the same as those provided in the Kings County General Plan, and will be considered the applicable standards for this project.

The 2002 General Plan provided noise level compatibility standards for transportation and non-transportation (stationary) noise sources. Table 1 provides the City of Hanford 2002 General Plan noise standards for transportation noise sources and Table 2 provides the City of Hanford 2002 General Plan noise standards for non-transportation (stationary) noise sources.

For transportation noise sources, the General Plan sets noise compatibility standards for transportation noise sources in terms of the Day-Night Average Level ( $L_{dn}$ ) or CNEL. The  $L_{dn}$  represents the time-weighted energy average noise level for a 24-hour day, with a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). The  $L_{dn}$  represents cumulative exposure to noise over an extended period of time and are therefore calculated based upon *annual average* conditions. For non-transportation (stationary) noise sources, the General plan sets noise compatibly standards in terms of the  $L_{max}$  (maximum) and  $L_{eq}$  (equivalent sound level) metrics.

**TABLE 1**  
**CITY OF HANFORD**  
**MAXIMUM ALLOWABLE NOISE EXPOSURE**  
**TRANSPORTATION NOISE SOURCES**

| Land Use                           | Outdoor Activity Areas <sup>a</sup><br>L <sub>dn</sub> /CNEL, dB | Interior Spaces           |                                   |
|------------------------------------|------------------------------------------------------------------|---------------------------|-----------------------------------|
|                                    |                                                                  | L <sub>dn</sub> /CNEL, dB | L <sub>eq</sub> , dB <sup>b</sup> |
| Residential                        | 60 <sup>c</sup>                                                  | 45                        | --                                |
| Transient Lodging                  | 60 <sup>c</sup>                                                  | 45                        | --                                |
| Hospitals, Nursing Homes           | 60 <sup>c</sup>                                                  | 45                        | --                                |
| Theaters, Auditoriums, Music Halls | --                                                               | --                        | 35                                |
| Churches, Meeting Halls            | 60 <sup>c</sup>                                                  | --                        | 40                                |
| Office Buildings                   | --                                                               | --                        | 45                                |
| Schools, Libraries, Museums        | --                                                               | --                        | 45                                |
| Playgrounds, Neighborhood Parks    | 70                                                               | --                        | --                                |

Notes:

a Where the location of outdoor activity areas is unknown, the exterior noise-level standard shall be applied to the property line of the receiving land use.

b As determined for a typical worst case hour during periods of use.

c Where it is not possible to reduce noise in outdoor activity areas to 60 dB L<sub>dn</sub>/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L<sub>dn</sub>/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Source: City of Hanford 2002 General Plan

**TABLE 2**  
**CITY OF HANFORD**  
**NOISE-LEVEL PERFORMANCE STANDARDS FOR NEW PROJECTS AFFECTED**  
**BY OR INCLUDING NON-TRANSPORTATION (STATIONARY) NOISE SOURCES**

| Category                                      | Noise-Level Descriptor | Exterior Noise Level Standard<br>(Applicable at Property Line) |           | Interior Noise Level Standard |           |
|-----------------------------------------------|------------------------|----------------------------------------------------------------|-----------|-------------------------------|-----------|
|                                               |                        | Daytime                                                        | Nighttime | Daytime                       | Nighttime |
| Residential                                   | L <sub>eq</sub>        | 50                                                             | 45        | 40                            | 35        |
|                                               | L <sub>max</sub>       | 70                                                             | 65        | 60                            | 55        |
| Transient Lodging<br>Hospitals, Nursing Homes | L <sub>eq</sub>        | --                                                             | --        | 40                            | 35        |
|                                               | L <sub>max</sub>       | --                                                             | --        | 60                            | 55        |
| Theaters, Auditoriums,<br>Music Halls         | L <sub>eq</sub>        | --                                                             | --        | 35                            | 35        |
| Churches, Meeting Halls                       | L <sub>eq</sub>        | --                                                             | --        | 40                            | 40        |
| Office Buildings                              | L <sub>eq</sub>        | --                                                             | --        | 45                            | --        |
| Schools, Libraries,<br>Museums                | L <sub>eq</sub>        | --                                                             | --        | 45                            | --        |
| Playgrounds,<br>Neighborhood Parks            | L <sub>eq</sub>        | 65                                                             | --        | --                            | --        |

Notes:

Notes: Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

Source: City of Hanford 2002 General Plan

## State of California

There are no state noise standards that are applicable to the project.

## Federal Noise Standards

There are no federal noise standards that are applicable to the project.

### **b. Construction Noise and Vibration**

Section 9.10.060(10) (Noises Prohibited) of the City of Hanford Municipal Code<sup>2</sup> provides limitations on hours of construction. The Municipal codes states that the following is prohibited:

*The construction, demolition, alteration or repair of any building or the excavation of streets and highways other than between the hours of 7:00 a.m. and 8:00 p.m.*

Additional guidance can be provided by section 14-8.02A of the California Department of Transportation (Caltrans) Standard Specifications document which suggests that construction equipment should *not exceed 86 dBA  $L_{max}$  at a distance of 50 feet from job site activities from 9 p.m. to 6 a.m.*

There are no state or federal standards that specifically address construction vibration. Some guidance is provided by the Caltrans Transportation and Construction Vibration Guidance Manual<sup>3</sup>. The Manual provides guidance for determining annoyance potential criteria and damage potential threshold criteria. These criteria are provided below in Table 3 and Table 4, and are presented in terms of peak particle velocity (PPV) in inches per second (in/sec).

| TABLE 3                                          |                      |                                          |
|--------------------------------------------------|----------------------|------------------------------------------|
| GUIDELINE VIBRATION ANNOYANCE POTENTIAL CRITERIA |                      |                                          |
| Human Response                                   | Maximum PPV (in/sec) |                                          |
|                                                  | Transient Sources    | Continuous/Frequent Intermittent Sources |
| Barely Perceptible                               | 0.04                 | 0.01                                     |
| Distinctly Perceptible                           | 0.25                 | 0.04                                     |
| Strongly Perceptible                             | 0.9                  | 0.1                                      |
| Severe                                           | 2.0                  | 0.4                                      |

Source: Caltrans

| TABLE 4                                                  |                      |                                          |
|----------------------------------------------------------|----------------------|------------------------------------------|
| GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA  |                      |                                          |
| Structure and Condition                                  | Maximum PPV (in/sec) |                                          |
|                                                          | Transient Sources    | Continuous/Frequent Intermittent Sources |
| Extremely fragile, historic buildings, ancient monuments | 0.12                 | 0.08                                     |
| Fragile buildings                                        | 0.2                  | 0.1                                      |
| Historic and some old buildings                          | 0.5                  | 0.25                                     |
| Older residential structures                             | 0.5                  | 0.3                                      |
| New residential structures                               | 1.0                  | 0.5                                      |
| Modern industrial/commercial buildings                   | 2.0                  | 0.5                                      |
| Source: Caltrans                                         |                      |                                          |



### **3. SETTING**

The proposed Hanford Place Mixed-Use project site is situated north of State Route 198 (SR 198) in the southwest section of the City of Hanford. The project site is generally bound by SR 198 to the south, San Joaquin Valley Railroad (SJVR) to the north, and existing retail shopping center to the east, with a mini-storage facility and former amusement/water park located west of the project site.

The project consists of approximately 43 acres and is currently undeveloped land. In addition to the above-described adjacent land uses, there are existing residential land uses located to the north (across the SJVR line) and the south (across SR 198), along with a car dealership, hotel and other retail and commercial land uses as well.

#### **a. Background Noise Level Measurements**

Existing noise levels in the project vicinity are dominated by traffic noise along SR 198 and other local roadways as well railroad operations associated with the San Joaquin Valley Railroad (SJVR) and occasional aircraft overflights associated with Lemoore Naval Air Station and other local airports and airstrips. Measurements of existing ambient noise levels in the project vicinity were conducted between May 5, 2021 and May 6, 2021. Long-term (24-hour) ambient noise level measurements were conducted at two (2) locations (sites LT-1 and LT-2) within and adjacent to the project site. Ambient noise levels were measured for a period of 48 continuous hours at monitoring site LT-1 and LT-2.

Ambient noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL 820 sound level analyzers equipped with Bruel & Kjaer (B&K) Type 4176 ½" microphones. The monitors were calibrated with a B&K Type 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment complies with applicable specifications of the American National Standards Institute (ANSI) for Type 1 (precision) sound level meters.

Site LT-1 was located within the central portion of the project site, approximately 300 feet from the centerline of SR 198. Site LT-1 was exposed to traffic noise associated with vehicles on SR 198, as well as train operations along the SJVR line and occasional aircraft overflights. Site LT-2 was located near the northern portion of the project site, adjacent to the existing residential land uses, and approximately fifty (50) feet from the SJVR line. The locations of the long-term noise monitoring sites are provided on Figure 2.

Measured hourly energy average noise levels ( $L_{eq}$ ) at site LT-1 ranged from a low of 56.8 dB between 1:00 a.m. and 2:00 a.m. on May 5<sup>th</sup> to a high of 68.2 dBA between 8:00 a.m. and 9:00 a.m. on May 6<sup>th</sup>. Hourly maximum ( $L_{max}$ ) noise levels at site LT-1 ranged from 69.4 to 96.4 dBA. Residual noise levels at the monitoring site, as defined by the  $L_{90}$ , ranged from 43.3 to 64.1 dBA. The  $L_{90}$  is a statistical descriptor that defines the noise level exceeded 90% of the time during each hour of the sample period. The  $L_{90}$  is generally considered to represent the residual (or

background) noise level in the absence of identifiable single noise events from traffic, aircraft and other local noise sources. The measured  $L_{dn}$  value at site LT-1 for May 5<sup>th</sup> and May 6<sup>th</sup> was 68.8 dB  $L_{dn}$  and 68.9 dB  $L_{dn}$ , respectively. Figure 3 graphically depicts hourly variations in ambient noise levels at site LT-1 for each of the two monitoring days. Table 5 provides the measured hourly noise levels at ambient noise monitoring site LT-1, in terms of the City's noise standards (as described above in Table 2).

| <p><b>TABLE 5</b></p> <p><b>SUMMARY OF 24-HOUR AMBIENT NOISE MEASUREMENT DATA, SITE LT-1</b></p> <p><b>HANFORD PLACE</b></p> <p><b>MAY 5 &amp; 6, 2021</b></p> |                          |                  |                  |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------|------------------|------------------|
| Time                                                                                                                                                           | A-Weighted Decibels, dBA |                  |                  |                  |
|                                                                                                                                                                | May 5, 2021              |                  | May 6, 2021      |                  |
|                                                                                                                                                                | $L_{eq}$                 | $L_{max}$        | $L_{eq}$         | $L_{max}$        |
| 0:00:00                                                                                                                                                        | 57.0                     | 71.4             | 56.9             | 74.7             |
| 1:00:00                                                                                                                                                        | 56.8                     | 69.6             | 57.0             | 81.1             |
| 2:00:00                                                                                                                                                        | 58.1                     | 75.4             | 58.1             | 76.4             |
| 3:00:00                                                                                                                                                        | 57.6                     | 81.4             | 57.9             | 72.3             |
| 4:00:00                                                                                                                                                        | 62.4                     | 81.1             | 62.7             | 69.9             |
| 5:00:00                                                                                                                                                        | 65.5                     | 76.4             | 64.8             | 72.8             |
| 6:00:00                                                                                                                                                        | 66.0                     | 77.7             | 66.0             | 83.6             |
| 7:00:00                                                                                                                                                        | 66.4                     | 76.2             | 66.1             | 76.0             |
| 8:00:00                                                                                                                                                        | 65.2                     | 83.2             | 65.0             | 77.0             |
| 9:00:00                                                                                                                                                        | 64.2                     | 79.9             | 67.5             | 75.5             |
| 10:00:00                                                                                                                                                       | 67.4                     | 82.0             | 64.5             | 79.6             |
| 11:00:00                                                                                                                                                       | 63.7                     | 86.8             | 63.4             | 83.4             |
| 12:00:00                                                                                                                                                       | 61.1                     | 88.0             | 63.1             | 77.1             |
| 13:00:00                                                                                                                                                       | 63.2                     | 77.3             | 63.4             | 73.5             |
| 14:00:00                                                                                                                                                       | 64.0                     | 82.5             | 63.9             | 74.9             |
| 15:00:00                                                                                                                                                       | 66.2                     | 81.8             | 66.1             | 76.2             |
| 16:00:00                                                                                                                                                       | 66.0                     | 79.4             | 66.5             | 74.8             |
| 17:00:00                                                                                                                                                       | 65.9                     | 78.0             | 66.4             | 82.8             |
| 18:00:00                                                                                                                                                       | 63.7                     | 69.4             | 66.1             | 80.4             |
| 19:00:00                                                                                                                                                       | 63.1                     | 77.3             | 65.2             | 83.2             |
| 20:00:00                                                                                                                                                       | 63.2                     | 79.8             | 63.0             | 77.7             |
| 21:00:00                                                                                                                                                       | 63.6                     | 79.1             | 62.3             | 75.4             |
| 22:00:00                                                                                                                                                       | 61.5                     | 77.0             | 61.8             | 87.2             |
| 23:00:00                                                                                                                                                       | 58.1                     | 75.6             | 59.6             | 79.1             |
| Daytime (7 am to 10 pm)<br>Average (Range)                                                                                                                     | 64.5 (61.1-67.4)         | 81.0 (69.4-90.4) | 65.0 (62.3-68.2) | 79.1 (73.5-96.4) |
| Nighttime (10 pm to 7 am)<br>Average (Range)                                                                                                                   | 60.3 (56.8-66.0)         | 76.2 (69.6-81.4) | 60.5 (56.9-66.0) | 77.5 (69.9-87.2) |

Source: WJV Acoustics, Inc.

Measured hourly energy average noise levels ( $L_{eq}$ ) at site LT-2 ranged from a low of 42.9 dB between midnight and 1:00 a.m. on May 5<sup>th</sup> to a high of 75.2 dBA between 8:00 a.m. and 9:00 p.m. on May 6<sup>th</sup>. Hourly maximum ( $L_{max}$ ) noise levels at site LT-2 ranged from 61.3 to 113.2 dBA.

Residual noise levels at the monitoring site, as defined by the  $L_{90}$ , ranged from 68.7 to 57.0 dBA. The measured  $L_{dn}$  value at site LT-2 for May 5<sup>th</sup> and May 6<sup>th</sup> was 67.6 dB  $L_{dn}$  and 64.9 dB  $L_{dn}$ , respectively. Figure 4 graphically depicts hourly variations in ambient noise levels at site LT-2 for each of the two monitoring days. Table 6 provides the measured hourly noise levels at ambient noise monitoring site LT-2, in terms of the City's performance standards (as described above in Table 2).

| <p><b>TABLE 6</b></p> <p><b>SUMMARY OF 24-HOUR AMBIENT NOISE MEASUREMENT DATA, SITE LT-2</b></p> <p><b>HANFORD PLACE</b></p> <p><b>MAY 5 &amp; 6, 2021</b></p> |                          |                   |                  |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|------------------|-------------------|
| Time                                                                                                                                                           | A-Weighted Decibels, dBA |                   |                  |                   |
|                                                                                                                                                                | May 5, 2021              |                   | May 6, 2021      |                   |
|                                                                                                                                                                | $L_{eq}$                 | $L_{max}$         | $L_{eq}$         | $L_{max}$         |
| 0:00:00                                                                                                                                                        | 54.7                     | 67.6              | 42.9             | 62.8              |
| 1:00:00                                                                                                                                                        | 49.7                     | 66.9              | 44.3             | 61.3              |
| 2:00:00                                                                                                                                                        | 51.8                     | 62.4              | 46.7             | 63.7              |
| 3:00:00                                                                                                                                                        | 48.5                     | 65.2              | 48.3             | 63.0              |
| 4:00:00                                                                                                                                                        | 55.8                     | 81.2              | 54.5             | 72.8              |
| 5:00:00                                                                                                                                                        | 61.3                     | 78.6              | 62.6             | 82.8              |
| 6:00:00                                                                                                                                                        | 57.6                     | 67.0              | 58.7             | 74.5              |
| 7:00:00                                                                                                                                                        | 59.8                     | 79.5              | 56.0             | 74.7              |
| 8:00:00                                                                                                                                                        | 59.0                     | 83.1              | 75.2             | 113.2             |
| 9:00:00                                                                                                                                                        | 57.2                     | 74.2              | 56.1             | 74.8              |
| 10:00:00                                                                                                                                                       | 77.5                     | 106.8             | 56.5             | 78.6              |
| 11:00:00                                                                                                                                                       | 59.7                     | 82.8              | 57.8             | 84.1              |
| 12:00:00                                                                                                                                                       | 57.7                     | 77.6              | 60.2             | 83.9              |
| 13:00:00                                                                                                                                                       | 55.5                     | 77.2              | 58.4             | 81.3              |
| 14:00:00                                                                                                                                                       | 56.5                     | 72.7              | 54.7             | 69.9              |
| 15:00:00                                                                                                                                                       | 55.7                     | 72.9              | 60.0             | 86.2              |
| 16:00:00                                                                                                                                                       | 56.7                     | 73.9              | 56.8             | 77.7              |
| 17:00:00                                                                                                                                                       | 75.9                     | 104.9             | 55.8             | 72.4              |
| 18:00:00                                                                                                                                                       | 56.1                     | 73.4              | 56.2             | 73.1              |
| 19:00:00                                                                                                                                                       | 57.6                     | 80.1              | 56.8             | 84.3              |
| 20:00:00                                                                                                                                                       | 56.5                     | 76.2              | 54.0             | 68.6              |
| 21:00:00                                                                                                                                                       | 57.1                     | 76.4              | 55.9             | 65.2              |
| 22:00:00                                                                                                                                                       | 56.8                     | 79.2              | 53.6             | 63.7              |
| 23:00:00                                                                                                                                                       | 53.8                     | 69.0              | 53.6             | 69.2              |
| Daytime (7 am to 10 pm)<br>Average (Range)                                                                                                                     | 59.9 (55.5-77.5)         | 80.8 (72.7-106.8) | 58.0 (54.0-75.2) | 79.2 (65.2-113.2) |
| Nighttime (10 pm to 7 am)<br>Average (Range)                                                                                                                   | 54.4 (48.5-61.3)         | 70.8 (62.4-81.2)  | 51.7 (42.9-62.6) | 68.2 (61.3-82.8)  |

Source: WJV Acoustics, Inc.

Additionally, short-term (15-minute) ambient noise level measurements were conducted at four (4) locations (Sites ST-1 through ST-4). Two (2) individual measurements were taken at each of

the four short-term sites to quantify ambient noise levels in the morning and afternoon hours. The locations of the long-term and short-term noise monitoring sites are shown in Figure 2.

Table 7 summarizes short-term noise measurement results. The noise measurement data included energy average ( $L_{eq}$ ) maximum ( $L_{max}$ ) as well as five individual statistical parameters. Observations were made of the dominant noise sources affecting the measurements. The statistical parameters describe the percent of time a noise level was exceeded during the measurement period. For instance, the  $L_{90}$  describes the noise level exceeded 90 percent of the time during the measurement period, and is generally considered to represent the residual (or background) noise level in the absence of identifiable single noise events from traffic, aircraft and other local noise sources.

Short-term noise measurements were conducted for 15-minute periods at each of the four sites. Sites ST-1 was located near the northeast portion of the project site, in the vicinity of existing retail/commercial land uses adjacent to the project site. Site ST-2 was located near the project site access point along Campus Drive. Site ST-3 was located near the northwestern portion of the project site, in the parking lot of Adventist Health Hospital. Site ST-4 was located at the intersection of Campus Drive and 7<sup>th</sup> Street, north of the project site. The overall noise measurement data indicate that noise in the project vicinity is highly influenced by vehicular traffic and noise associated with landscaping activities, retail/commercial activities and other sources typical of residential land uses (barking dogs, roosters, birds, voices, etc.).

| <p><b>TABLE 7</b></p> <p><b>SUMMARY OF SHORT-TERM NOISE MEASUREMENT DATA</b></p> <p><b>HANFORD PLACE</b></p> <p><b>MAY 5 &amp; 6, 2021</b></p> |           |                          |           |       |       |          |          |          |           |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------|-----------|-------|-------|----------|----------|----------|-----------|
| Site                                                                                                                                           | Time      | A-Weighted Decibels, dBA |           |       |       |          |          |          | Sources   |
|                                                                                                                                                |           | $L_{eq}$                 | $L_{max}$ | $L_2$ | $L_8$ | $L_{25}$ | $L_{50}$ | $L_{90}$ |           |
| ST-1                                                                                                                                           | 7:35 a.m. | 51.8                     | 56.0      | 54.7  | 53.5  | 52.3     | 51.6     | 50.1     | TR, V, R  |
| ST-1                                                                                                                                           | 4:25 p.m. | 53.7                     | 62.1      | 55.4  | 54.1  | 53.3     | 52.0     | 49.8     | TR, D, AC |
| ST-2                                                                                                                                           | 8:05 a.m. | 62.6                     | 76.3      | 72.0  | 68.1  | 61.1     | 53.0     | 50.3     | TR, AG    |
| ST-2                                                                                                                                           | 4:45 p.m. | 56.7                     | 62.3      | 55.0  | 54.1  | 53.2     | 49.7     | 48.5     | TR        |
| ST-3                                                                                                                                           | 8:30 a.m. | 51.9                     | 70.1      | 55.0  | 52.0  | 49.9     | 49.3     | 48.2     | TR, V, B  |
| ST-3                                                                                                                                           | 5:10 p.m. | 52.1                     | 66.6      | 54.7  | 52.2  | 48.9     | 47.8     | 47.0     | TR, AC    |
| ST-4                                                                                                                                           | 8:50 a.m. | 60.3                     | 77.0      | 69.6  | 63.4  | 59.1     | 55.3     | 50.8     | TR, B, D  |
| ST-4                                                                                                                                           | 5:30 p.m. | 61.4                     | 74.2      | 71.0  | 65.2  | 60.7     | 56.3     | 51.4     | TR, AC, D |

TR: Traffic AC: Aircraft AG: Agricultural Activities V: Voices B: Birds D: Barking Dogs R:Rooster  
Source: WJV Acoustics, Inc.

#### **4. NOISE IMPACTS TO OFF-SITE SENSITIVE RECEPTORS, AND MITIGATION MEASURES**

##### **a. Project Traffic Noise Impacts on Existing Noise-Sensitive Land Uses Outside Project Site (Less Than Significant)**

WJVA utilized the FHWA Traffic Noise Model<sup>4</sup> to quantify expected project-related increases in traffic noise exposure along roadways in the project vicinity. The FHWA Model is a standard analytical method used by state and local agencies for roadway traffic noise prediction. The model is based upon reference energy emission levels for automobiles, medium trucks (2 axles) and heavy trucks (3 or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly  $L_{eq}$  values for free-flowing traffic conditions, and is generally considered to be accurate within  $\pm 1.5$  dB. To predict  $L_{dn}$  values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Average Daily Traffic (ADT) volumes for the analyzed receptor locations were provided by the project traffic consultant, VRPA Technologies, Inc.<sup>5</sup>. Truck percentages and the day/night distribution of traffic were estimated by WJVA, based upon previous studies conducted in the project vicinity since project-specific data were not available from government sources. The Noise modeling assumptions used to calculate project traffic noise are provided as Appendix C.

Traffic noise exposure levels for specific scenarios were calculated based upon the FHWA Model and the above-described model inputs and assumptions. Project-related significant impacts would occur if an increase in traffic noise associated with the project would result in noise levels exceeding the City's applicable noise level standards at the location(s) of sensitive receptors. For the purpose of this analysis a significant impact was also assumed to occur if traffic noise levels were to increase by 3 dB at sensitive receptor locations where noise levels already exceed the City's applicable noise level standards (without the project), as 3 dB generally represents the threshold of perception in change for the human ear.

The City's exterior noise level standard for residential land uses is 60 dB  $L_{dn}$  (an exterior noise exposure of up to 65 dB  $L_{dn}$  is allowed in instances where it is not possible to reduce noise exposure in outdoor activity areas to 60  $L_{dn}$  or less using a practical application of available noise reduction measures.). Traffic noise was modeled at seven (7) receptor locations. The seven modeled receptors are located at roadway setback distances representative of the sensitive receptors (residences) along each analyzed roadway segment. The receptor locations are described below and provided graphically on Figure 5.

- R-1: Residential land use located approximately 90 feet from the centerline of Lacey Blvd.
- R-2: Residential land use located approximately 60 feet from the centerline of 7<sup>th</sup> St.
- R-3: Residential land use located approximately 95 feet from the centerline of 7<sup>th</sup> St.
- R-4: Residential land use located approximately 60 feet from the centerline of 6<sup>th</sup> St.
- R-5: Residential land use located approximately 100 feet from the centerline of Campus Dr.



- R-6: Residential land use located approximately 95 feet from the centerline of 7<sup>th</sup> St.
- R-7: Residential land use located approximately 90 feet from the centerline of 6<sup>th</sup> St.

### **Existing Conditions**

Table 8 provides Existing and Existing Plus Project traffic noise exposure levels at the seven analyzed receptor locations. The receptor locations are representative of existing residential land uses located along the analyzed roadway segments.

| <p style="text-align: center;"><b>TABLE 8</b></p> <p style="text-align: center;"><b>PROJECT-RELATED INCREASES IN TRAFFIC NOISE, dB, L<sub>dn</sub></b></p> <p style="text-align: center;"><b>HANFORD PLACE</b></p> <p style="text-align: center;"><b>EXISTING CONDITIONS</b></p> |                 |                              |                         |                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------|-------------------------|----------------------------|
| <b>Modeled Receptor</b>                                                                                                                                                                                                                                                          | <b>Existing</b> | <b>Existing Plus Project</b> | <b>Change (Maximum)</b> | <b>Significant Impact?</b> |
| R-1                                                                                                                                                                                                                                                                              | 63              | 63                           | 0                       | No                         |
| R-2                                                                                                                                                                                                                                                                              | 62              | 62                           | 0                       | No                         |
| R-3                                                                                                                                                                                                                                                                              | 58              | 59                           | +1                      | No                         |
| R-4                                                                                                                                                                                                                                                                              | 55              | 58                           | +3                      | No                         |
| R-5                                                                                                                                                                                                                                                                              | 51              | 51                           | 0                       | No                         |
| R-6                                                                                                                                                                                                                                                                              | 59              | 59                           | 0                       | No                         |
| R-7                                                                                                                                                                                                                                                                              | 52              | 52                           | 0                       | No                         |

Source: WJV Acoustics, Inc.  
VRPA Technologies, Inc.

Reference to Table 8 indicates that project-related traffic would not result in noise levels at any sensitive receptors to exceed the City's noise level standard, nor result in an increase of 3 dB in any sensitive receptor locations where noise levels already exceed the City's noise level standard without the implementation of the project.

### **Cumulative 2042 Conditions**

Table 9 provides Cumulative 2042 traffic noise exposure levels at the seven analyzed representative receptor locations, and also provides what the project contribution would be to Cumulative 2042 traffic noise exposure conditions.

| <p style="text-align: center;"><b>TABLE 9</b></p> <p style="text-align: center;"><b>PROJECT CONTRIBUTION TO CUMULATIVE TRAFFIC NOISE, dB, L<sub>dn</sub></b></p> <p style="text-align: center;"><b>HANFORD PLACE</b></p> <p style="text-align: center;"><b>CUMULATIVE CONDITIONS</b></p> |                                                    |                       |                      |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------|----------------------|---------------------|
| Modeled Receptor                                                                                                                                                                                                                                                                         | Cumulative Conditions Without Project Contribution | Cumulative Conditions | Project Contribution | Significant Impact? |
| R-1                                                                                                                                                                                                                                                                                      | 64                                                 | 64                    | 0                    | No                  |
| R-2                                                                                                                                                                                                                                                                                      | 64                                                 | 64                    | 0                    | No                  |
| R-3                                                                                                                                                                                                                                                                                      | 60                                                 | 60                    | 0                    | No                  |
| R-4                                                                                                                                                                                                                                                                                      | 56                                                 | 59                    | +3                   | No                  |
| R-5                                                                                                                                                                                                                                                                                      | 53                                                 | 53                    | 0                    | No                  |
| R-6                                                                                                                                                                                                                                                                                      | 61                                                 | 61                    | 0                    | No                  |
| R-7                                                                                                                                                                                                                                                                                      | 54                                                 | 54                    | 0                    | No                  |

Source: WJV Acoustics, Inc.  
VRPA Technologies, Inc.

Reference to Table 9 indicates that the project's contribution to Cumulative 2042 traffic noise exposure levels at the modeled representative receptor locations would not result in noise levels to exceed the City's noise level standard, nor result in an increase of 3 dB in any sensitive receptor locations where noise levels already exceed the City's noise level standard without the implementation of the project. Consequently, the project contribution to cumulative noise levels would be less than considerable and the project would not have a significant cumulative impact.

Noise levels described in Table 8 and Table 9 do not take into account any site-specific acoustic shielding that may be provided by existing sound walls, buildings or intervening topography, and should therefore be considered a worst-case assessment of traffic noise exposure at the analyzed receptor locations.

#### **b. Proposed Impacts From Operational On-Site Sources (Less Than Significant With Mitigation)**

The project would include a variety of medical buildings, hotel and conference center, medical instruction facilities, retail/drive thru buildings, commercial buildings and a multi-family apartment building. A wide variety of noise sources can be associated with these land use designations. The noise levels produced by such sources can also be highly variable and could potentially impact existing off-site and proposed on-site sensitive receptors. Typical examples of stationary noise sources associated with such land uses include:

- HVAC/Mechanical equipment
- Truck deliveries
- Parking lot activities (closing of car doors and trunks, stereos, alarms etc.)
- Drive Thru operations

### **Mechanical Equipment**

It is assumed that the project would include roof-mounted HVAC units on the proposed buildings. The heating, ventilating, and air conditioning (HVAC) requirements for the buildings would likely require the use of multiple packaged roof-top units. For the purpose of noise and aesthetics, roof-mounted HVAC units are typically shielded by means of a roof parapet. WJVA has conducted reference noise level measurements at numerous commercial and retail buildings with roof-mounted HVAC units, and associated noise levels typically range between approximately 45-50 dB at a distance of 50 feet from the building façade.

For this project, the closest residential property lines to any potential roof-mounted HVAC equipment would be located at a minimum setback distance of 200 feet. Taking into account the standard rate of noise attenuation with increased distance from a point source (-6 dB/doubling of distance), noise levels associated with the operation of roof-mounted HVAC units would be approximately 33-38 dB at the closest sensitive receptor property line. Such levels do not exceed any City of Hanford noise level standard or exceed existing (without project) ambient noise levels.

### **Truck Movements**

At the time of this analysis, a specific truck access route (or routes) had not been designated. However, trucks would access the project site by one of three (3) access points, Glendale Avenue from the west, Campus Drive from the north or 5<sup>th</sup> Street from the east. It is assumed that truck deliveries would occur at various times and locations throughout the overall project area. Precise details on truck deliveries were not known at the time of this analysis.

WJVA has conducted measurements of the noise levels produced by slowly moving trucks for a number of studies. Such truck movements would be expected to produce noise levels in the range of 65 to 71 dBA at a distance of 100 feet. The range in measured truck noise levels is due to differences in the size of trucks, their speed of movement and whether they have refrigeration units in operation during the pass-by.

If truck movements were to access the project site via the 5<sup>th</sup> Street access point, truck movements could occur as close as approximately 130 feet from the closest residential property lines to the north. At this distance, noise levels associated with truck movements would produce maximum noise levels in the range of approximately 63 to 69 dB. Such noise levels do not exceed the City's daytime (7:00 a.m. to 10:00 p.m.) noise level standard of 70 dB  $L_{max}$ , but could potentially exceed the City's nighttime (10:00 p.m. to 7:00 a.m.) noise level standard of 65 dB  $L_{max}$ . It should be noted that existing ambient noise levels in the vicinity of the future 5<sup>th</sup> Street access point (noise monitoring site LT-2) exceeded the City's nighttime 65 dB  $L_{max}$  standard during twelve of the eighteen nighttime hours measured over the two-day monitoring period.

### **Potential Impact:**

Noise levels associated with truck movements could exceed the City's 65 dB  $L_{max}$  nighttime noise level standard at the residential property lines north of the 5<sup>th</sup> Street access point, if truck deliveries were to occur between the nighttime hours of 10:00 p.m. to 7:00 a.m.

**Mitigation Measures:**

Noise levels associated with nighttime (10:00 p.m. to 7:00 a.m.) truck movements could be mitigated by applying the following condition:

- Require truck movements occurring during nighttime hours of 10:00 p.m. to 7:00 a.m. to use the Glendale Avenue access point only.

**Parking Lot Activities**

Noise due to traffic in parking lots is typically limited by low speeds and is not usually considered to be significant. Human activity in parking lots that can produce noise includes voices, stereo systems and the opening and closing of car doors and trunk lids. Such activities can occur at any time. The noise levels associated with these activities cannot be precisely defined due to variables such as the number of parking movements, time of day and other factors. It is typical for a passing car in a parking lot to produce a maximum noise level of 60 to 65 dBA at a distance of 50 feet, which is comparable to the level of a raised voice.

For this project, parking would be dispersed throughout the overall project area. The closest proposed parking areas would be located at least 150 feet from the closest existing residential property lines to the north. At this distance, maximum ( $L_{max}$ ) parking lot vehicle movements would be expected to be approximately 51 to 56 dB. Such levels would not exceed any of the City's applicable noise levels standards or exceed existing ambient noise levels at the closest residential land uses. Due to existing elevated ambient noise levels at the closest sensitive receptor locations (residential land uses north of the project site), noise levels associated with parking lot activities would generally not be audible over existing (without project) noise levels.

**Drive Thru Retail**

The proposed project would include two (2) retail areas that would likely include drive thru operations. While the exact tenants and type of retail store was not known at this time, it is assumed that amplified speech would be incorporated into drive thru operations.

In order to assess potential project noise levels associated with drive-thru operations, WJVA utilized reference noise levels measured at a Wendy's drive-thru restaurant located on South Mooney Boulevard in Visalia. Measurements were conducted during the early afternoon of July 11, 2011 between 12:45 p.m. and 1:45 p.m. using the previously-described noise monitoring equipment.

The microphone used by customers to order food and the loudspeaker used by employees to confirm orders are both integrated into a menu board that is located a few feet from the drive-thru lane at the approximate height of a typical car window. Vehicles would enter the drive-thru lane from the west and then turn to the north along the east side of the restaurant.

Reference noise measurements were obtained at a distance of approximately 40 feet from the menu board containing the microphone/loudspeaker system at an angle of about 45° toward the

rear of the vehicle being served. This provided a worst-case exposure to sound from the loudspeaker system since the vehicle was not located directly between the loudspeaker and measurement location. Cars were lined up in the access lane during the noise measurement period indicating that the drive-through lane was operating at or near a peak level of activity.

Each ordering cycle was observed to take approximately 60 seconds including vehicle movements. A typical ordering cycle included 5-10 seconds of loudspeaker use with typical maximum noise levels in the range of 60-62 dBA at the 40 foot-reference location. Vehicles moving through the drive-thru lane produced noise levels in the range of 55-60 dBA at the same distance. Vehicles parked at the ordering position (between the menu board and measurement site) were observed to provide significant acoustic shielding during the ordering sequence. The effects of such shielding are reflected by the noise measurement data. Noise levels were measured to approximately 60 dB  $L_{eq}$  at the measurement site, and included noise from all sources, including the loudspeaker, vehicle movements and HVAC equipment.

The closest noise-sensitive receptors (residential land uses) to the proposed retail drive thru operations are located approximately 190 feet to the north. At this setback distance, noise levels associated with drive thru retail operations would be expected to produce noise levels of approximately 47-49 dB  $L_{max}$  and approximately 46 dB  $L_{eq}$ . Potential project-related noise exposure at that locations of the closest residential land uses was calculated based upon the above-described reference noise measurement data, the existing sound walls and the normal rate of sound attenuation over distance for a “point” noise source (6 dB/doubling of distance).

It is unknown if nighttime operations would occur at the drive thru retail locations. The above-described noise level of 46 dB  $L_{eq}$  at the closest residential property line assumes the drive thru would be in constant operation, and should therefore we consider a worst-case assessment of drive thru noise levels. While drive thru operational noise levels (46 dB  $L_{eq}$ ) slightly exceed the City’s nighttime noise level standard of 45 dB  $L_{eq}$ , such levels are below existing (without project) nighttime ambient noise levels at the residential property lines, and would therefore not be considered a significant impact.

### **c. Noise from Construction (Less Than Significant With Mitigation)**

Construction noise would occur at various locations within the project site through the buildout period and at locations where off-site infrastructure improvements may be required. Existing sensitive receptors could be located as close as 150 feet from construction activities. Table 10 provides typical construction-related noise levels at distances of 100 feet, 200 feet, and 300 feet.

Construction noise is not considered to be a significant impact if construction is limited to the allowed hours and construction equipment is adequately maintained and muffled. The City of Hanford limits hours of construction to occur only between the hours of 7:00 a.m. to 8:00 p.m. Construction noise impacts could result in annoyance or sleep disruption for nearby residents if nighttime operations were to occur or if equipment is not properly muffled or maintained.



**TABLE 10**  
**TYPICAL CONSTRUCTION EQUIPMENT**  
**MAXIMUM NOISE LEVELS, dBA**

| Type of Equipment   | 100 Ft. | 200 Ft. | 300 Ft. |
|---------------------|---------|---------|---------|
| Concrete Saw        | 84      | 78      | 74      |
| Crane               | 75      | 69      | 65      |
| Excavator           | 75      | 69      | 65      |
| Front End Loader    | 73      | 67      | 63      |
| Jackhammer          | 83      | 77      | 73      |
| Paver               | 71      | 65      | 61      |
| Pneumatic Tools     | 79      | 73      | 69      |
| Dozer               | 76      | 70      | 66      |
| Rollers             | 74      | 68      | 64      |
| Trucks              | 80      | 72      | 70      |
| Pumps               | 74      | 68      | 64      |
| Scrapers            | 81      | 75      | 71      |
| Portable Generators | 74      | 68      | 64      |
| Backhoe             | 80      | 74      | 70      |
| Grader              | 80      | 74      | 70      |

Source: FHWA

*Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987*

### **Potential Impact:**

A noise impact could occur if construction activities do not incorporate appropriate mitigation measures and best management practices.

### **Mitigation Measures:**

Noise levels associated with construction activities may be effectively mitigated by incorporating noise mitigation measures and appropriate best management practices. The following mitigation measures and best management practices should be applied during periods of project construction.

- Per the City of Hanford Municipal Code, construction activities should not occur outside the hours of 7:00 a.m. to 8:00 p.m.
- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.
- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.

- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing the contact phone number of a designated noise disturbance coordinator.

#### d. Vibration Impacts (Less Than Significant)

The dominant sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. None of these activities are anticipated to occur with construction or operation of the proposed project. Vibration from construction activities could be detected at the closest sensitive land uses, especially during movements by heavy equipment or loaded trucks and during some paving activities (if they were to occur). Typical vibration levels at distances of 100 feet and 300 feet are summarized by Table 11. These levels would not be expected to exceed any significant threshold levels for annoyance or damage, as provided above in Table 3 and Table 4.

| TABLE 11<br>TYPICAL VIBRATION LEVELS DURING CONSTRUCTION |              |         |
|----------------------------------------------------------|--------------|---------|
| Equipment                                                | PPV (in/sec) |         |
|                                                          | @ 100'       | @ 300'  |
| Bulldozer (Large)                                        | 0.011        | 0.006   |
| Bulldozer (Small)                                        | 0.0004       | 0.00019 |
| Loaded Truck                                             | 0.01         | 0.005   |
| Jackhammer                                               | 0.005        | 0.002   |
| Vibratory Roller                                         | .03          | 0.013   |
| Caisson Drilling                                         | .01          | 0.006   |

Source: Caltrans

After full project build out, it is not expected that ongoing operational activities will result in any vibration impacts at nearby sensitive uses. Activities involved in trash bin collection could result in minor on-site vibrations as the bin is placed back onto the ground. Such vibrations would not be expected to be felt at the closest off-site sensitive uses. Additional mitigation is not required.

## **5. NOISE IMPACTS TO PROPOSED ON-SITE SENSITIVE RECEPTORS, AND MITIGATION MEASURES**

The project includes proposed sensitive receptors (residential land uses, transient lodging, nursing homes, offices, etc.) that could be impacted by exterior and interior noise exposure associated with existing transportation noise sources (SR 198 and SJVR line). The applicable exterior and interior noise level standards for such land uses are provided above as Table 1.

### **a. Project Transportation Noise Impacts on Proposed On-Site Noise-Sensitive Land Uses (Less Than Significant With Mitigation)**

#### **Exterior Noise Exposure**

Exterior noise exposure within the project site is dominated by vehicle traffic associated with State Route 198 to the south and railroad operations associated with the San Joaquin Valley Railroad line to the north. Noise levels measured at ambient noise monitoring sites LT-1 and LT-2 indicate that overall project site noise exposure is approximately 65-70 dB  $L_{dn}$ .

The exterior noise level standard applicable to the above-described sensitive receptors is 60 dB  $L_{dn}$ . The General Plan also states that where it is not possible to reduce noise in outdoor activity areas to 60 dB  $L_{dn}$ /CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB  $L_{dn}$ /CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Exterior noise level compatibility standards for transportation noise sources are applied at the outdoor activity areas of sensitive receptors. Outdoor activity areas typically include backyards of single-family residential uses and outdoor common use areas (pools, BBQ/picnic areas, playgrounds, etc.) as well as individual patios, balconies and decks of multi-family residential uses and transient lodging land uses. The exact locations of such outdoor activity areas were not known at the time of this analysis; however, the project site plan (Figure 1) provides preliminary locations of pool areas for both the apartment development and the hotel development. Other proposed sensitive receptors (memory care facility, assisted living facility, skilled nursing facility, etc.) may also include outdoor activity areas, at which this exterior noise level standard would apply.

#### **Potential Impact:**

Transportation noise exposure levels would be expected to exceed the City's 60 dB  $L_{dn}$  exterior noise level standard at outdoor activity areas associated with the multi-family apartment land use and the hotel land use. Additionally, depending on the locations (if included into final project design) of any outdoor activity areas associated with other noise-sensitive land uses (as defined above in Table 1), transportation noise exposure levels could exceed the City's exterior noise level standard at such land uses as well.

**Mitigation Measures:**

Based upon project site noise exposure (approximately 65-70 dB  $L_{dn}$ ) and the preliminary locations of the apartment and hotel pool areas (outdoor activity areas), mitigating exterior noise levels at these locations to at or below 60 dB  $L_{dn}$  would likely not be feasible. However, a preliminary analysis using a sound wall insertion loss model indicates that a sound wall constructed to a minimum height of six-and-a-half (6.5) feet above ground level constructed around the two pool areas (apartment and hotel land uses) would mitigate exterior noise levels to below 65 dB  $L_{dn}$  within these outdoor activity areas.

Other proposed sensitive receptors (memory care facility, assisted living facility, skilled nursing facility, etc.) may also include outdoor activity areas, at which this exterior noise level standard would apply. The potential locations of outdoor activity areas associated with these land uses was not known at the time of this analysis. However, a similarly constructed sound wall around such uses would reduce noise levels to below 65 dB  $L_{dn}$ . Such noise levels are allowed by the City.

**Interior Noise Exposure**

As described above, exterior project site noise exposure throughout the overall project area is approximately 65-70 dB  $L_{dn}$ , as a result of varying levels of proximity to both State Route 198 and the San Joaquin Valley Railroad line. Additionally, peak hour exterior noise levels would be approximately 70 dB  $L_{eq}$  at the exterior of the office land uses to the north and the nursing college to the south. Interior noise level standards applicable to the project site vary, based upon proposed land uses. These interior noise level standards applicable to the project are:

- 45 dB  $L_{dn}$ : Multi-family apartment, Hotel, skilled nursing facility, memory care facility, assisted living facility, and any additional facility where people are residing and sleep disturbance is considered.
- 45 dB  $L_{eq}$ : Office buildings, Nursing College (as determined for a typical worst case hour during periods of use)

Based upon the above-described exterior noise exposure levels and applicable interior noise level standards, the proposed construction measures must be capable of providing approximately 25 dB of outdoor-to-indoor noise level reduction (NLR) ( $70-45=25$ ).

Generally speaking, construction measures complying with current building code standards would typically be expected to provide approximately 20-25 dB of outdoor-to-indoor NLR, provided windows and doors can remain closed for sound insulation purposes. However, additional sound attenuation measures may be required in conditions where the exterior façade consists of large portions of window or storefront glazing assemblies. Once construction plans are developed, an acoustical consultant should review to determine if additional interior noise level mitigation measures may be required.

**Potential Impact:**

Interior noise level standards applicable to the project's proposed noise-sensitive land uses are described above. Exterior exposure levels at the exterior facades of proposed noise-sensitive land uses would be in the range of approximately 60-75 dB  $L_{dn}$  and 70 dB  $L_{eq}$  (peak hour). Depending

on final construction design, interior noise levels could potentially exceed the various applicable noise level standards of 45 dB  $L_{dn}$  and 45 dB  $L_{eq}$ .

**Mitigation Measures:**

Once building-specific construction plans become available, interior noise levels should be reviewed and calculated by a qualified acoustical consultant to determine if additional noise attenuation mitigation measures are required to comply with interior noise level standards.

**b. Noise Impacts from Nearby Airports or Airstrips (No Impact)**

The Project site is located approximately 1.5 miles west of Hanford Municipal Airport. WJVA has reviewed the Kings County Airport Land Use Compatibility Plan<sup>6</sup> to determine if the project would result in any noise compatibility concerns associated with airport operations. No portion of the project site is contained within any airport noise contours, and would therefore not result in any noise compatibility issues. The Hanford Municipal Airport noise contours are provided as Figure 6.



## **6. IMPACT SUMMARY**

This impact summary addresses only the noise impacts determined to be “potentially significant” and summarizes the mitigation measures that would be required to reduce noise levels to a “less than significant” level or states that the impact may be significant and unavoidable. Potential impacts and correlating mitigation measures are described in detail above, and summarized below.

### **Potential Impact:**

Noise levels associated with truck movements could exceed the City’s 65 dB  $L_{max}$  nighttime noise level standard at the residential property lines north of the 5<sup>th</sup> Street access point, if truck deliveries were to occur between the nighttime hours of 10:00 p.m. to 7:00 a.m.

### **Mitigation Measures:**

Noise levels associated with nighttime (10:00 p.m. to 7:00 a.m.) truck movements could be mitigated by implementing the following condition:

- Require truck movements occurring during nighttime hours to use the Glendale Avenue access point only.

### **Potential Impact:**

A noise impact could occur if construction activities do not incorporate appropriate mitigation measures and best management practices.

### **Mitigation Measures:**

Noise levels associated with construction activities may be effectively mitigated by incorporating noise mitigation measures and appropriate best management practices. The following mitigation measures and best management practices should be applied during periods of project construction.

- Per the City of Hanford Municipal Code, construction activities should not occur outside the hours of 7:00 a.m. to 8:00 p.m.
- All construction equipment shall be properly maintained and muffled as to minimize noise generation at the source.
- Noise-producing equipment shall not be operating, running, or idling while not in immediate use by a construction contractor.

- All noise-producing construction equipment shall be located and operated, to the extent possible, at the greatest possible distance from any noise-sensitive land uses.
- Locate construction staging areas, to the extent possible, at the greatest possible distances from any noise-sensitive land uses.
- Signs shall be posted at the construction site and near adjacent sensitive receptors displaying hours of construction activities and providing the contact phone number of a designated noise disturbance coordinator.

#### **Potential Impact:**

Transportation noise exposure levels would be expected to exceed the City's 60 dB  $L_{dn}$  exterior noise level standard at outdoor activity areas associated with the multi-family apartment land use and the hotel land use. Additionally, depending on the locations (if included into final project design) of any outdoor activity areas associated with other noise-sensitive land uses (as defined above in Table 1), transportation noise exposure levels could exceed the City's exterior noise level standard at such land uses as well.

#### **Mitigation Measures:**

Based upon project site noise exposure (approximately 65-70 dB  $L_{dn}$ ) and the preliminary locations of the apartment and hotel pool areas (outdoor activity areas), mitigating exterior noise levels at these locations to at or below 60 dB  $L_{dn}$  would likely not be feasible. However, a preliminary analysis using a sound wall insertion loss model indicates that a sound wall constructed to a minimum height of six-and-a-half (6.5) feet above ground level constructed around the two pool areas (apartment and hotel land uses) would mitigate exterior noise levels to below 65 dB  $L_{dn}$  within these outdoor activity areas. Such noise levels are allowed by the City.

Other proposed sensitive receptors (memory care facility, assisted living facility, skilled nursing facility, etc.) may also include outdoor activity areas, at which the exterior noise level standard would apply. The potential locations of outdoor activity areas associated with these land uses was not known at the time of this analysis. However, a similarly constructed sound wall around such uses would reduce noise levels to below 65 dB  $L_{dn}$ .

#### **Potential Impact:**

Interior noise level standards applicable to the project's proposed noise-sensitive land uses are described above. Exterior exposure levels at the exterior facades of proposed noise-sensitive land uses would be in the range of approximately 60-75 dB  $L_{dn}$  and 70 dB  $L_{eq}$ . Depending on final construction design, interior noise levels could potentially exceed the various applicable noise level standards of 45 dB  $L_{dn}$  and 45 dB  $L_{eq}$ .

#### **Mitigation Measures:**

Based upon the above-described exterior noise exposure levels and applicable interior noise level standards, the proposed construction measures must be capable of providing approximately 25 dB of outdoor-to-indoor noise level reduction (NLR) ( $70-45=25$ ).

Generally speaking, construction measures complying with current building code standards would typically be expected to provide approximately 20-25 dB of outdoor-to-indoor NLR, provided windows and doors can remain closed for sound insulation purposes. However, additional sound attenuation measures may be required in conditions where the exterior façade consists of large portions of windows and/or storefront glazing assemblies. Once construction plans are developed, an acoustical consultant should review to determine if additional interior noise level mitigation measures may be required. Such measures would typically include the incorporation of sound-rated (higher STC) windows and assemblies.

## **7. SOURCES CONSULTED**

1. *City of Hanford 2035 General Plan*, April 2017
2. *City of Hanford Municipal Code*, 2016
3. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, September 2013.
4. Federal Highway Administration, *Traffic Noise Model, Version 2.5*, April 14, 2004
5. Hodges & Shutt, *Kings County Airport Land Use Compatibility Plan*, July 1994

FIGURE 1: PROJECT SITE PLAN



FIGURE 3

LSA

NOT TO SCALE

SOURCE: LANGDON WILSON INTERNATIONAL, 2020.

FILE:0\PA\EP12001 Hanford Place\PRODUCTS\Figure\_3.ai (4/22/2020)

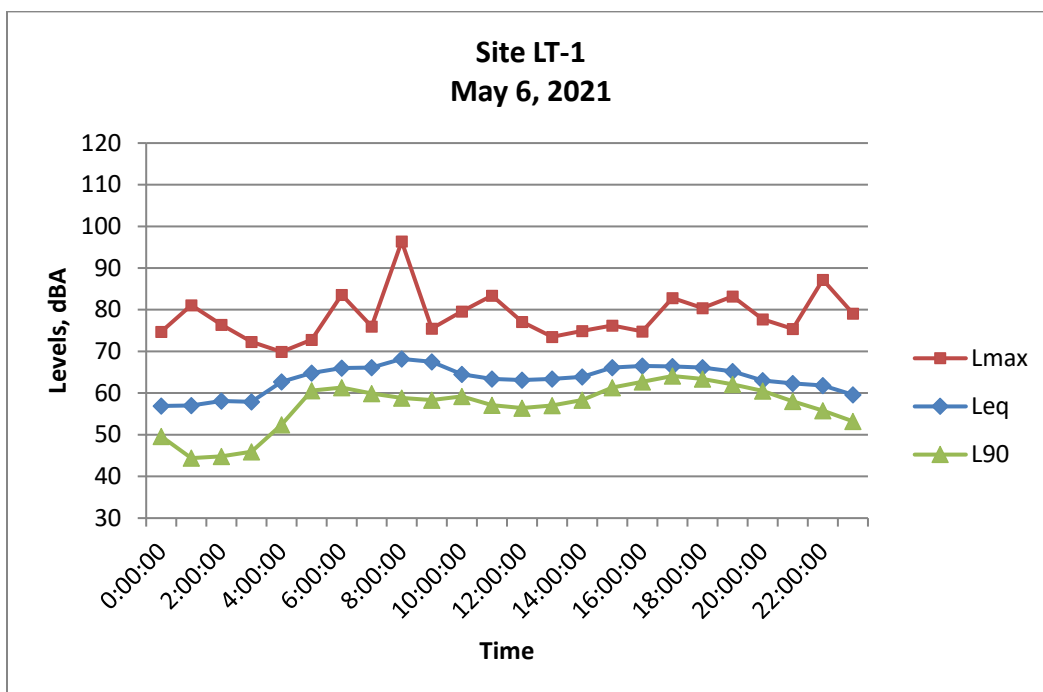
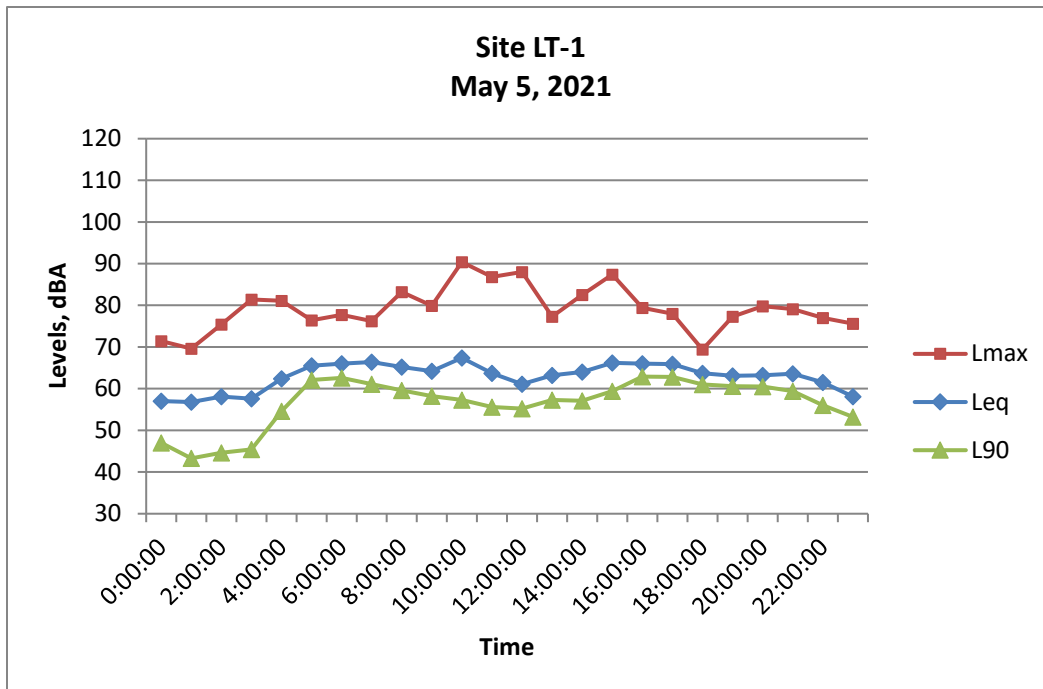
Hanford Place Project  
Hanford, Kings County, California  
Site Plan



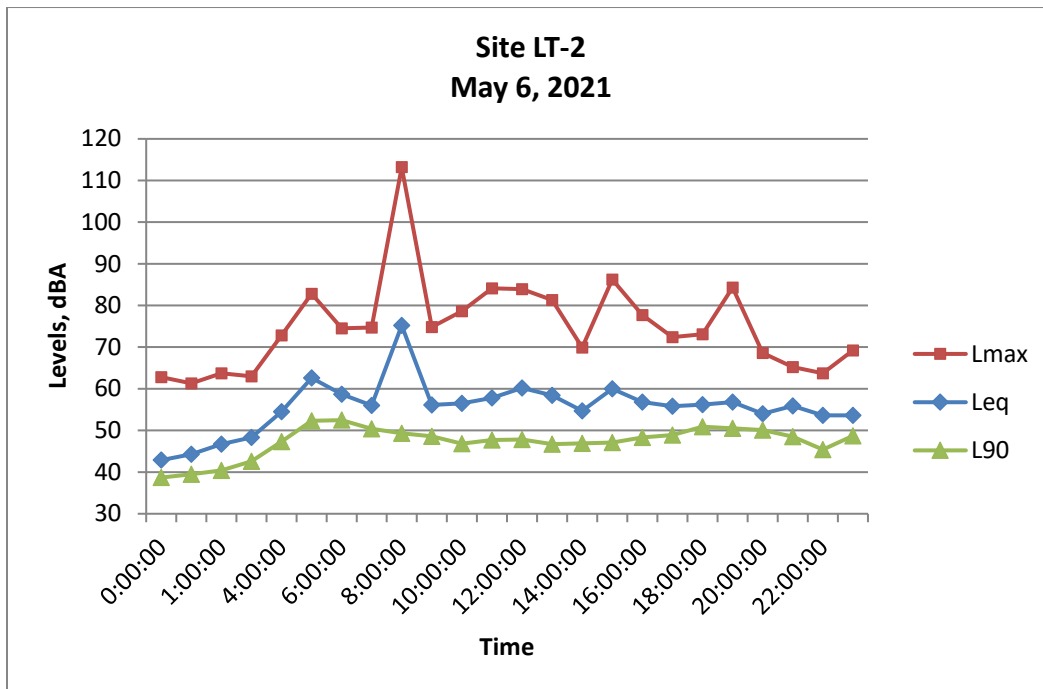
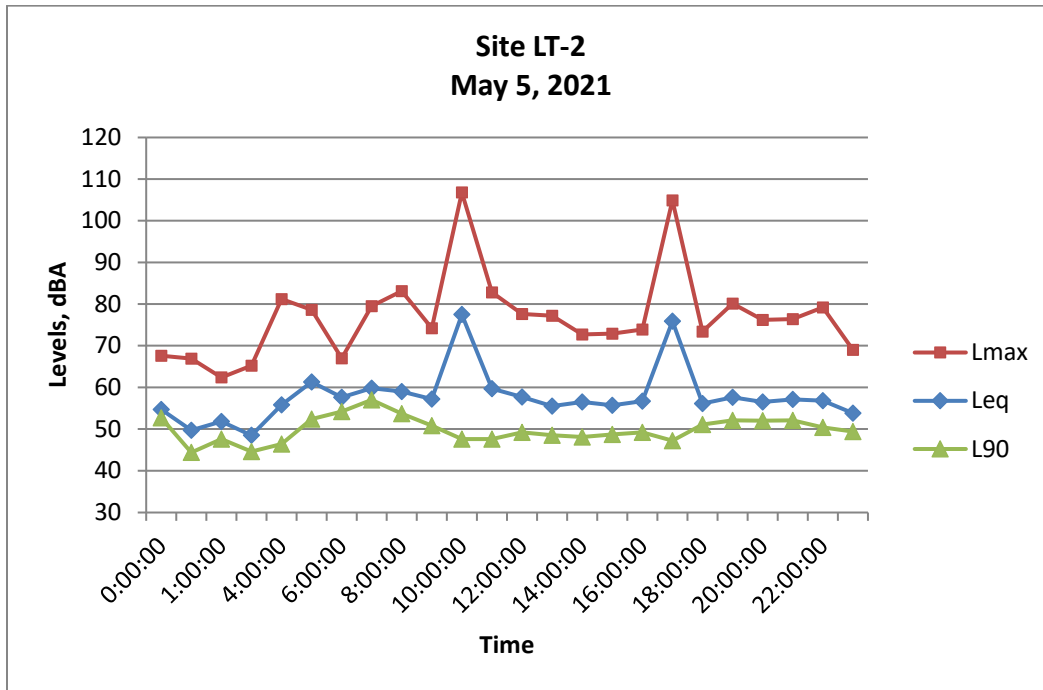
**FIGURE 2: PROJECT VICINITY AND AMBIENT NOISE MONITORING SITES**



**FIGURE 3: HOURLY NOISE LEVELS AT SITE LT-1**



**FIGURE 4: HOURLY NOISE LEVELS AT SITE LT-2**

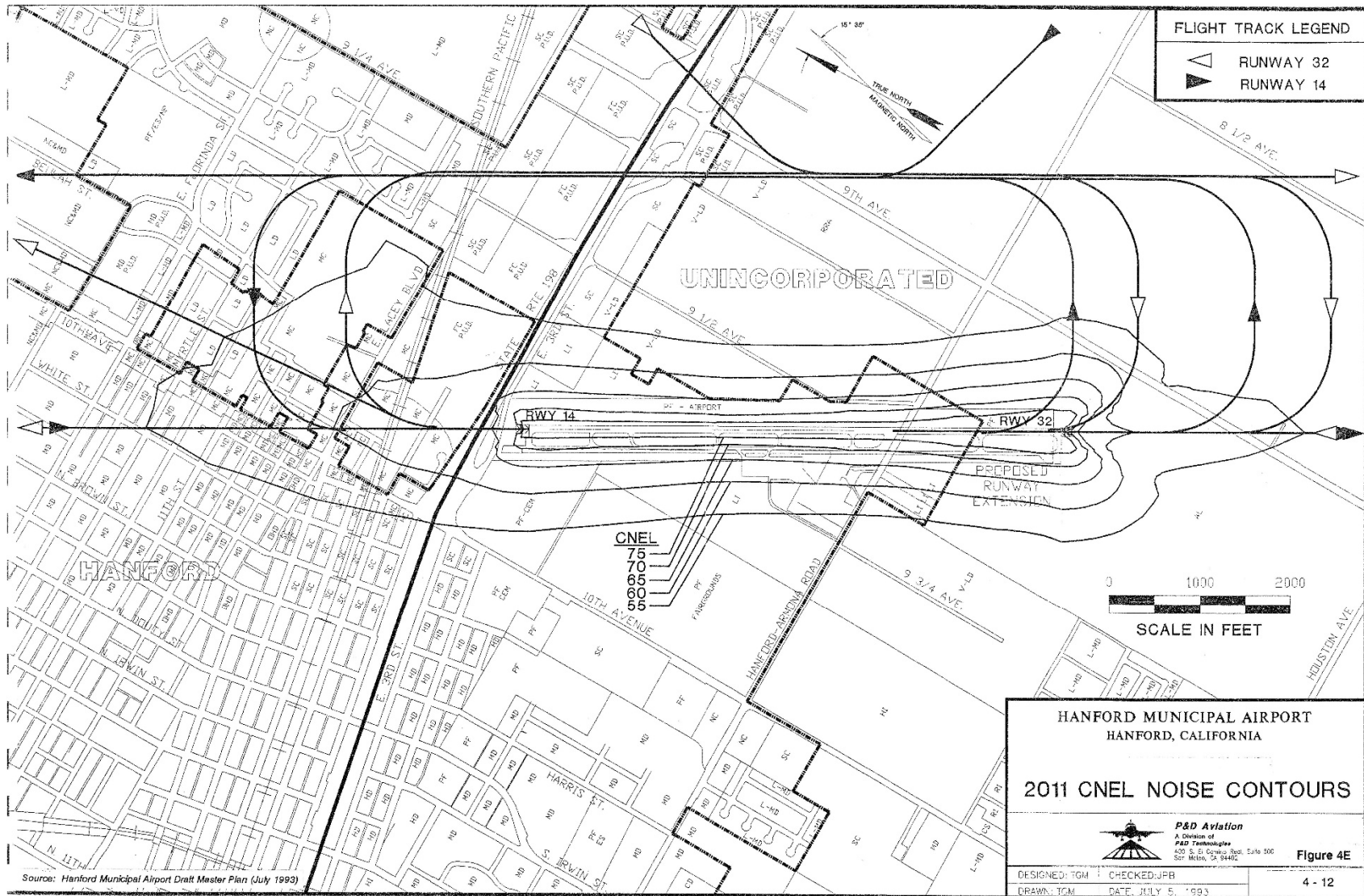




**FIGURE 5: MODELED TRAFFIC NOISE RECEPTOR LOCATIONS**



**FIGURE 6: HANFORD MUNICIPAL AIRPORT NOISE CONTOURS**





## APPENDIX A-1

### ACOUSTICAL TERMINOLOGY

|                             |                                                                                                                                                                                                                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AMBIENT NOISE LEVEL:</b> | The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.                                                                                                               |
| <b>CNEL:</b>                | Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m. |
| <b>DECIBEL, dB:</b>         | A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).                                                           |
| <b>DNL/L<sub>dn</sub>:</b>  | Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.                                                                                                |
| <b>L<sub>eq</sub>:</b>      | Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L <sub>eq</sub> is typically computed over 1, 8 and 24-hour sample periods.                                                                                         |
| <b>NOTE:</b>                | The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L <sub>eq</sub> represents the average noise exposure for a shorter time period, typically one hour.                                                                                                 |
| <b>L<sub>max</sub>:</b>     | The maximum noise level recorded during a noise event.                                                                                                                                                                                                                                            |
| <b>L<sub>n</sub>:</b>       | The sound level exceeded "n" percent of the time during a sample interval (L <sub>90</sub> , L <sub>50</sub> , L <sub>10</sub> , etc.). For example, L <sub>10</sub> equals the level exceeded 10 percent of the time.                                                                            |

## A-2

### ACOUSTICAL TERMINOLOGY

#### **NOISE EXPOSURE CONTOURS:**

Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

#### **NOISE LEVEL REDUCTION (NLR):**

The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of “noise level reduction” combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

#### **SEL or SENEL:**

Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

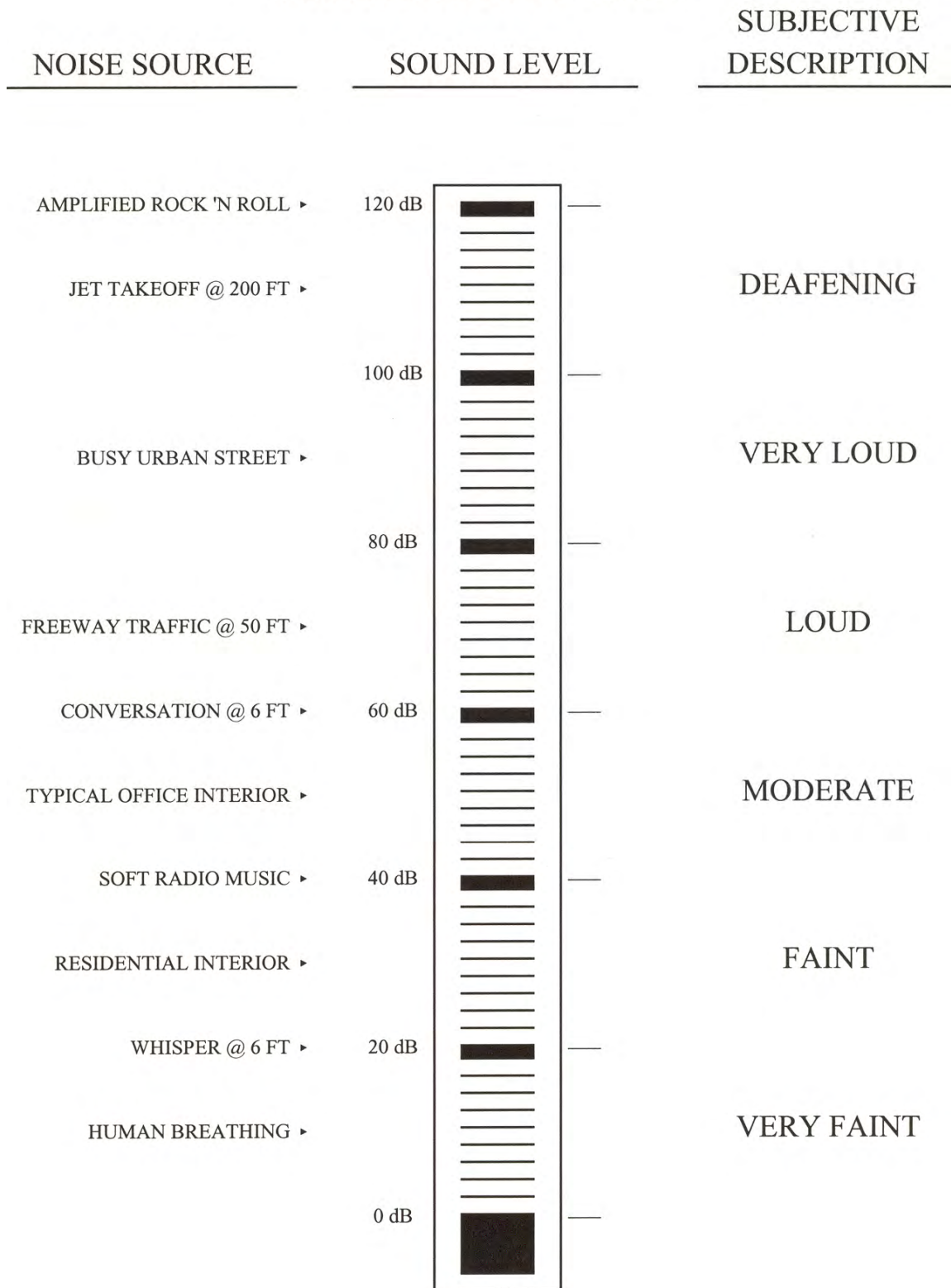
#### **SOUND LEVEL:**

The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

#### **SOUND TRANSMISSION CLASS (STC):**

The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

# APPENDIX B EXAMPLES OF SOUND LEVELS



**APPENDIX C**

**TRAFFIC NOISE MODELING CALCULATIONS**

**WJV Acoustics, Inc**  
**FHWA-RD-77-108**  
**Calculation Sheets**  
 May 7, 2021

|              |          |
|--------------|----------|
| Project #:   | 20-016   |
| Description: | Existing |
| Ldn/Cnel:    | Ldn      |
| Site Type:   | Soft     |

**Contour Levels (dB)**

|    |    |    |    |  |  |  |  |  |
|----|----|----|----|--|--|--|--|--|
| 60 | 65 | 70 | 75 |  |  |  |  |  |
|----|----|----|----|--|--|--|--|--|

[illegible]



**WJV Acoustics, Inc**  
**FHWA-RD-77-108**  
**Calculation Sheets**  
 May 7, 2021

|              |                    |
|--------------|--------------------|
| Project #:   | 20-016             |
| Description: | Existing + project |
| Ldn/Cnel:    | Ldn                |
| Site Type:   | Soft               |

**Contour Levels (dB)**

|    |    |    |    |  |  |  |  |  |
|----|----|----|----|--|--|--|--|--|
| 60 | 65 | 70 | 75 |  |  |  |  |  |
|----|----|----|----|--|--|--|--|--|

[illegible]

**WJV Acoustics, Inc**  
**FHWA-RD-77-108**  
**Calculation Sheets**  
 May 7, 2021

|              |                 |
|--------------|-----------------|
| Project #:   | 20-016          |
| Description: | 2042 No Pojrect |
| Ldn/Cnel:    | Ldn             |
| Site Type:   | Soft            |

|                            |    |    |    |    |  |  |  |  |  |
|----------------------------|----|----|----|----|--|--|--|--|--|
| <b>Contour Levels (dB)</b> | 60 | 65 | 70 | 75 |  |  |  |  |  |
|----------------------------|----|----|----|----|--|--|--|--|--|

[illegible]

|              |                |
|--------------|----------------|
| Project #:   | 20-016         |
| Description: | 2042 + Pojrect |
| Ldn/Cnel:    | Ldn            |
| Site Type:   | Soft           |

[illegible]

---

## APPENDIX F

### TRAFFIC IMPACT STUDY

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# DRAFT

## Hanford Place Development

Traffic Impact Study  
December 2020

**Prepared by:**

VRPA Technologies, Inc.  
4630 W. Jennifer, Suite 105  
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## Hanford Place Development Traffic Impact Study

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## Executive Summary

This Traffic Impact Study (TIS) has been prepared for the purpose of analyzing traffic conditions related to the Hanford Place Development (Project). The various components of the Project are detailed in Table E-1 below. The Project site is generally bound to the north by the San Joaquin Valley Railroad, to the east by commercial land uses, to the south by State Route 198, and to the west by commercial land uses. Regional access to the site is provided by State Route 198, which is located adjacent to the southern border of the project site.

The vacant project site is comprised of four parcels and is located between State Route 198 and the San Joaquin Valley Railroad in the City of Hanford (City), in Kings County (Kings). 5th Street cuts through the project site in an east/west direction and Campus Drive cuts through the project in a north/south direction. In addition, the Peoples Ditch runs through the project site.

The city of Hanford is located 30 miles south of the City of Fresno and 20 miles west of the City of Visalia. Hanford was incorporated in 1891 and is the county seat of Kings County. Hanford is located in the northern portion of Kings County at an elevation of 249 feet above sea level. The city has a total area of 16.6 square miles, all of which is land not covered by water. The only natural watercourse is Mussel Slough, remnants of which still exist on the city's western edge. The People's Ditch, an irrigation canal dug in the 1870s, traverses Hanford from north to south.

Vehicular access to the site would be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right of way. The proposed project would also construct a roundabout, which would also be dedicated as public right of way and would be constructed to Caltrans or City-approved standards. As part of the project, Glendale Avenue would be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle would be removed, and Glendale Avenue would be realigned using speed-specific design curves. Any new portions of Glendale Avenue would be dedicated as public right of way and any portion of existing right of way not used would be abandoned. 5th Street would be extended starting at the existing alignment before realigning to the roundabout. In addition, the proposed project would provide 1,466 parking spaces throughout the project site.

The TIS completed for the Project includes level of service (LOS) analysis for the following traffic scenarios.

- ✓ Existing Conditions
- ✓ Existing Plus Project
- ✓ Near-Term Plus Project
- ✓ Cumulative Year 2042 Without Project
- ✓ Cumulative Year 2042 Plus Project

**Table E-1**  
**Project Components**

| PROJECT COMPONENTS          | SIZE/UNIT  | DESCRIPTION                                                                                                                                                                                                                                                                            |
|-----------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambulatory Surgery Center   | 22,525 sf  | This facility is used to handle approximately 25 surgical procedures per day. There will be approximately 12 employees. This only operates weekdays.                                                                                                                                   |
| Specialty Clinic            | 12,445 sf  | This will be an Office of Statewide Health Planning and Development's (OSHDP) 3 facility, which in turn will approve advanced scope for medical care (i.e.: radiology/oncology. This will be a Monday-Saturday facility.                                                               |
| Medical Office Building     | 24,890 sf  | This will be standard weekday medical offices.                                                                                                                                                                                                                                         |
| Psychiatric Health Facility | 12,445 sf  | This is a psychiatric health care facility. This will consist of 24 patients who stay an average of 5 days. There will be approximately 10 employees and this use will operate 24/7. There will be approximately 4 admissions/discharges per day all done via ambulance.               |
| Hotel & Conference Center   | 105 Rooms  | This will be a standard traffic count for hotels and will be a limited service hotel. The conference center will be used on an average of 2 times per week including weekends.                                                                                                         |
| Nursing College             | 35,000 sf  | This is a m-sat operation. The School hosts 4 classes per scheduling window and offer three scheduling windows per day. Average class length is 2.5 hours. Average student enrollment is 8 students per class. Total classes of 12 per day and start at 8am and finish at 930pm.       |
| Skilled Nursing Facility    | 54,611 sf  | Skilled nursing facility with average of 1.5 admits per day and 1 discharge per day. Staff ratio of 1:6 with a total of 59 beds. It is a 24/7 operation and there are usually approximately 20 visitors/service provider visits per day. No patients/residents have access to vehicles |
| Memory Care                 | 34,480 sf  | Like above SNF, however longer length of stay (average stay of 45 days) so less vehicle traffic inbound and outbound. Same staff ratio and same visit count by visitors/service providers.                                                                                             |
| Assisted Living Facility    | 34,380 sf  | Limited use of vehicles for residents. On average ¼ of residents have vehicles parked full time at facility. Majority of residents use facilities bus transportation. This is 24/7 as well and staff ratio is 1:8.                                                                     |
| Multi-Family Apartment      | 90 Units   | Standard                                                                                                                                                                                                                                                                               |
| Medical/Commercial          | 114,000 sf | This will be standard weekday medical offices.                                                                                                                                                                                                                                         |

## IMPACTS

### Intersections

Table E-2 provides the intersection level of service analysis for the study intersections considering the study scenarios discussed above. Potential mitigation measures are discussed below. Results of the analysis show that the Project will contribute to an unacceptable LOS at five (5) of the study intersections when comparing the Cumulative Year 2042 scenarios.

### Segments

Table E-3 shows roadway segments that are expected to fall short of desirable operating conditions for various scenarios. Potential mitigation measures are discussed below. Results of the analysis also show that the Project will result in a cumulative impact at two (2) of the study roadway segments when comparing the Cumulative Year 2042 scenarios.

**Table E-2**  
**Intersection Operations**

| INTERSECTION                                    | CONTROL           | TARGET LOS      | PEAK HOUR | EXISTING     |     | EXISTING PLUS PROJECT |     | NEAR-TERM PLUS PROJECT |     | CUMULATIVE YEAR 2042 WITHOUT PROJECT |     | CUMULATIVE YEAR 2042 PLUS PROJECT |     |
|-------------------------------------------------|-------------------|-----------------|-----------|--------------|-----|-----------------------|-----|------------------------|-----|--------------------------------------|-----|-----------------------------------|-----|
|                                                 |                   |                 |           | DELAY        | LOS | DELAY                 | LOS | DELAY                  | LOS | DELAY                                | LOS | DELAY                             | LOS |
| 1. 12th Avenue / Glendale Avenue                | Two-Way Stop Sign | D               | AM        | 22.7         | C   | 30.2                  | D   | <b>37.2</b>            | E   | <b>74.4</b>                          | F   | <b>154.4</b>                      | F+  |
|                                                 |                   |                 | PM        | <b>100.4</b> | F+  | <b>184.6</b>          | F+  | <b>269.9</b>           | F+  | ++                                   | F   | ++                                | F+  |
| 2. 12th Avenue / SR 198 WB Ramps                | Signalized        | -- <sup>1</sup> | AM        | 13.8         | B   | 13.7                  | B   | 14.5                   | B   | 18.8                                 | B   | 19.9                              | B   |
|                                                 |                   |                 | PM        | 17.8         | B   | 19.4                  | B   | 23.0                   | C   | 64.5                                 | E   | 75.1                              | E   |
| 3. 12th Avenue / SR 198 EB Ramps                | Signalized        | -- <sup>1</sup> | AM        | 11.9         | B   | 12.5                  | B   | 12.7                   | B   | 13.2                                 | B   | 13.7                              | B   |
|                                                 |                   |                 | PM        | 13.0         | B   | 13.6                  | B   | 14.3                   | B   | 19.0                                 | B   | 20.1                              | C   |
| 4. Campus Drive / Lacey Boulevard               | Signalized        | D               | AM        | 25.0         | C   | 25.2                  | C   | 25.4                   | C   | 25.7                                 | C   | 25.5                              | C   |
|                                                 |                   |                 | PM        | 28.0         | C   | 29.2                  | C   | 31.4                   | C   | 52.2                                 | D   | 52.9                              | D   |
| 5. Campus Drive / 7th Street                    | All-Way Stop Sign | D               | AM        | 9.9          | A   | 11.9                  | B   | 12.6                   | B   | 12.1                                 | B   | 15.0                              | B   |
|                                                 |                   |                 | PM        | 15.6         | C   | 23.7                  | C   | 31.8                   | D   | <b>92.9</b>                          | F   | <b>146.9</b>                      | F   |
| 6. Campus Drive / 6th Street                    | Two-Way Stop Sign | D               | AM        | 10.4         | B   | 13.3                  | B   | 13.6                   | B   | 10.7                                 | B   | 13.1                              | B   |
|                                                 |                   |                 | PM        | 10.6         | B   | 13.9                  | B   | 14.3                   | B   | 11.5                                 | B   | 14.7                              | B   |
| 7. 11th Avenue / Lacey Boulevard                | Signalized        | D               | AM        | 20.4         | C   | 20.3                  | C   | 21.0                   | C   | 25.3                                 | C   | 25.9                              | C   |
|                                                 |                   |                 | PM        | 27.5         | C   | 28.5                  | C   | 31.6                   | C   | 49.9                                 | D   | 52.7                              | D   |
| 8. 11th Avenue / 7th Street                     | Signalized        | D               | AM        | 18.9         | C   | 18.9                  | B   | 19.7                   | B   | 24.2                                 | C   | 24.4                              | C   |
|                                                 |                   |                 | PM        | 28.8         | C   | 29.0                  | C   | 31.8                   | C   | <b>55.6</b>                          | E   | <b>57.6</b>                       | E   |
| 9. 11th Avenue / 6th Street                     | Two-Way Stop Sign | D               | AM        | 12.6         | B   | 12.7                  | B   | 13.3                   | B   | 17.1                                 | C   | 17.3                              | C   |
|                                                 |                   |                 | PM        | 17.4         | C   | 18.1                  | C   | 20.6                   | C   | <b>74.3</b>                          | F   | <b>83.6</b>                       | F   |
| 10. 11th Avenue / 5th Street                    | Signalized        | D               | AM        | 4.9          | A   | 9.6                   | A   | 9.7                    | A   | 6.5                                  | A   | 10.7                              | B   |
|                                                 |                   |                 | PM        | 12.1         | B   | 18.1                  | B   | 19.5                   | B   | 23.8                                 | C   | 42.3                              | D   |
| 11. 11th Avenue / 4th Street-SR 198 WB On Ramp  | Signalized        | -- <sup>1</sup> | AM        | 12.0         | B   | 15.3                  | B   | 15.9                   | B   | 16.4                                 | B   | 20.8                              | C   |
|                                                 |                   |                 | PM        | 12.7         | B   | 14.6                  | B   | 15.6                   | B   | 21.0                                 | C   | 28.4                              | C   |
| 12. 11th Avenue / 3rd Street-SR 198 EB Off Ramp | Signalized        | -- <sup>1</sup> | AM        | 18.6         | B   | 21.0                  | C   | 22.9                   | C   | 27.0                                 | C   | 30.2                              | C   |
|                                                 |                   |                 | PM        | 25.1         | C   | 30.6                  | C   | 35.4                   | D   | 76.3                                 | E   | 97.4                              | F   |

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized and all-way stop intersections, delay results show the average for the entire intersection. For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

1 - With the changes brought about by SB 743, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020 and the Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance will be used in determining the need for roadway improvements on Caltrans facilities.

+ Meets peak hour signal warrants.

++ Delay Exceeds 300 seconds.

**Table E-3**  
**Segment Operations**

| STREET SEGMENT                      | SEGMENT DESCRIPTION | TARGET LOS | PEAK HOUR | EXISTING |     | EXISTING PLUS PROJECT |     | NEAR-TERM PLUS PROJECT |     | CUMULATIVE YEAR 2042 WITHOUT PROJECT |     | CUMULATIVE YEAR 2042 PLUS PROJECT |     |
|-------------------------------------|---------------------|------------|-----------|----------|-----|-----------------------|-----|------------------------|-----|--------------------------------------|-----|-----------------------------------|-----|
|                                     |                     |            |           | VOLUME   | LOS | VOLUME                | LOS | VOLUME                 | LOS | VOLUME                               | LOS | VOLUME                            | LOS |
| Lacey Boulevard                     |                     |            |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| 12th Avenue to Campus Drive         | 4 Lanes Divided     | D          | AM        | 855      | C   | 919                   | C   | 990                    | C   | 1,322                                | C   | 1,386                             | C   |
|                                     |                     |            | PM        | 1,693    | C   | 1,767                 | C   | 1,907                  | C   | 2,617                                | D   | 2,691                             | D   |
| Campus Drive to 11th Avenue         | 4 Lanes Divided     | D          | AM        | 963      | C   | 1,027                 | C   | 1,107                  | C   | 1,489                                | C   | 1,553                             | C   |
|                                     |                     |            | PM        | 1,873    | C   | 1,947                 | C   | 2,101                  | C   | 2,896                                | D   | 2,970                             | E   |
| 7th Street                          |                     |            |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| Campus Drive to 11th Avenue         | 2 Lanes Undivided   | D          | AM        | 346      | D   | 378                   | D   | 407                    | D   | 535                                  | D   | 567                               | D   |
|                                     |                     |            | PM        | 743      | D   | 780                   | D   | 841                    | D   | 1,149                                | E   | 1,186                             | E   |
| 6th Street                          |                     |            |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| Campus Drive to 11th Avenue         | 2 Lanes Undivided   | D          | AM        | 127      | C   | 127                   | C   | 137                    | C   | 196                                  | C   | 196                               | C   |
|                                     |                     |            | PM        | 142      | C   | 142                   | C   | 154                    | C   | 220                                  | C   | 220                               | C   |
| Glendale Avenue                     |                     |            |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| East of 12th Avenue                 | 2 Lanes Undivided   | D          | AM        | 130      | C   | 323                   | C   | 334                    | D   | 201                                  | C   | 394                               | D   |
|                                     |                     |            | PM        | 163      | C   | 385                   | D   | 399                    | D   | 252                                  | C   | 474                               | D   |
| 5th Avenue                          |                     |            |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| West of 11th Avenue                 | 2 Lanes Undivided   | D          | AM        | 101      | C   | 359                   | D   | 367                    | D   | 156                                  | C   | 414                               | D   |
|                                     |                     |            | PM        | 464      | D   | 760                   | D   | 799                    | D   | 717                                  | D   | 1,014                             | D   |
| Campus Drive                        |                     |            |           |          |     |                       |     |                        |     |                                      |     |                                   |     |
| Lacey Bouloevard to Glendale Avenue | 2 Lanes Undivided   | D          | AM        | 251      | C   | 380                   | D   | 400                    | D   | 388                                  | D   | 517                               | D   |
|                                     |                     |            | PM        | 393      | D   | 541                   | D   | 574                    | D   | 608                                  | D   | 756                               | D   |

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

## MITIGATION

As discussed above, the potentially significant impacts resulting from the Project relate to the generation of unacceptable LOS at various intersections and road segments in the long term. Considering the criteria provided in Section 1.3 and the results presented above, the following improvements are recommended to alleviate project-specific impacts.

## INTERSECTIONS

- ✓ 12<sup>th</sup> Avenue at Glendale Avenue  
*No Recommended improvements.*

Installation of a traffic signal would alleviate level of service deficiencies at the intersection for all study scenarios. However, providing a traffic signal at this location is not practical given the close spacing of adjacent intersections. In lieu of the traffic signal, dual right turn lanes for the eastbound and westbound approaches to the intersection should be considered to alleviate queuing at the eastbound and westbound approaches.

- ✓ Campus Drive at 7<sup>th</sup> Street  
*Recommended improvements to achieve acceptable levels of service:*
  - Cumulative Year 2042 Plus Project scenario:
    - Install Traffic Signal

The improvements identified above for the Cumulative Year 2042 Plus Project scenario are sufficient to meet the City of Hanford's acceptable LOS standard of 'D'.

- ✓ 11<sup>th</sup> Avenue at 7<sup>th</sup> Street  
*No Recommended improvements.*

Providing additional turning movement lanes along 11<sup>th</sup> Avenue and 7<sup>th</sup> Street is not possible due to design constraints or infeasible/impractical due to the presence of commercial development that currently exists along the north and south side of 7<sup>th</sup> Street.

- ✓ 11<sup>th</sup> Avenue at 6<sup>th</sup> Street  
*No Recommended improvements.*

This intersection is forecasted to operate at unacceptable LOS 'F' (PM) under Cumulative Year 2042 Without Project and Cumulative Year 2042 Plus Project conditions; however, this intersection does not meet the peak hour traffic signal warrant because the minor approaches do not carry enough traffic to justify signalization. Therefore, no improvements are recommended for the Project's contribution of traffic at the intersection for the Cumulative Year 2042 Plus Project condition.

- ✓ 12<sup>th</sup> Avenue at SR 198 WB Ramps  
*No Recommended improvements.*



Providing additional turning movement lanes at the 12<sup>th</sup> Avenue and SR 198 WB Ramps intersection is not possible due to design constraints or infeasible/impractical due to the presence of development that currently exists along the north side of the SR 198 WB Ramps. As noted in Section 1.3, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes.

✓ 11<sup>th</sup> Avenue at 3<sup>rd</sup> Street-SR 198 EB Off Ramp

*No Recommended improvements.*

Providing additional turning movement lanes at the 11<sup>th</sup> Avenue and 3<sup>rd</sup> Street-SR 198 EB Off Ramp intersection is not possible due to design constraints or infeasible/impractical due to the presence of development that currently exists along the south side of 3<sup>rd</sup> Street and the SR 198 EB Off Ramp. As noted in Section 1.3, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes.

## ROADWAY SEGMENTS

✓ Lacey Boulevard between Campus Drive and 11<sup>th</sup> Avenue

*No Recommended improvements.*

Providing additional travel lanes along Lacey Boulevard is not possible due to design constraints or infeasible/impractical due to the presence of retail development that currently exists along the north and south side of Lacey Boulevard. In addition, accommodating additional travel lanes along Lacey Boulevard could result in the elimination of parking along Lacey Boulevard.

✓ 7<sup>th</sup> Street between Campus Drive and 11<sup>th</sup> Avenue

*Recommended improvements:*

- Cumulative Year 2042 Plus Project scenario:
  - Restripe to provide two-way left turn lane with removal of parking as necessary

Providing additional travel lanes along 7<sup>th</sup> Street is not possible due to right-of-way constraints.

## *Post-Mitigation Level of Significance*

The level of service resulting from the potential improvements identified above is shown in Tables E-4 and E-5.

This section documents the Project's fair-share responsibility towards the costs of improvements that are identified for the Cumulative Year 2042 scenario. The City of Hanford and the applicant have determined that the payment of the City's impact fees will satisfy the Project's obligations to pay for an equitable share of the improvements.

The formulas used to calculate the equitable share responsibility to City of Hanford facilities is as follows:

$$\text{Equitable Share} = (\text{Project Trips}) / (\text{Future Year Plus Project Traffic})$$

Table E-6 shows the Project's equitable fair share responsibility on a percentage basis for improvements to City of Hanford facilities as described above. The equitable fair share responsibility shown in Table E-6 is the result of LOS enhancements related to capacity.

**Table E-4**  
**Intersection Operations with Mitigation**

| INTERSECTION                                    | CONTROL           | TARGET LOS      | PEAK HOUR | EXISTING PLUS PROJECT |                      | NEAR-TERM PLUS PROJECT |                      | CUMULATIVE YEAR 2042 PLUS PROJECT |                      |
|-------------------------------------------------|-------------------|-----------------|-----------|-----------------------|----------------------|------------------------|----------------------|-----------------------------------|----------------------|
|                                                 |                   |                 |           | DELAY                 | LOS                  | DELAY                  | LOS                  | DELAY                             | LOS                  |
| 1. 12th Avenue / Glendale Avenue                | Two-Way Stop Sign | D               | AM        | 30.2                  | D                    | <b>37.2</b>            | <b>E<sup>2</sup></b> | <b>154.4</b>                      | <b>F<sup>2</sup></b> |
|                                                 |                   |                 | PM        | <b>184.6</b>          | <b>F<sup>2</sup></b> | <b>269.9</b>           | <b>F<sup>2</sup></b> | <b>++</b>                         | <b>F<sup>2</sup></b> |
| 2. 12th Avenue / SR 198 WB Ramps                | Signalized        | -- <sup>1</sup> | AM        |                       |                      |                        |                      | 19.9                              | B                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | 75.1                              | <b>E<sup>3</sup></b> |
| 5. Campus Drive / 7th Street                    | Signalized        | D               | AM        |                       |                      |                        |                      | 12.8                              | B                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | 20.4                              | C                    |
| 8. 11th Avenue / 7th Street                     | Signalized        | D               | AM        |                       |                      |                        |                      | 24.4                              | C                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | <b>57.6</b>                       | <b>E<sup>3</sup></b> |
| 9. 11th Avenue / 6th Street                     | Two-Way Stop Sign | D               | AM        |                       |                      |                        |                      | 17.3                              | C                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | <b>83.6</b>                       | <b>F<sup>4</sup></b> |
| 12. 11th Avenue / 3rd Street-SR 198 EB Off Ramp | Signalized        | -- <sup>1</sup> | AM        |                       |                      |                        |                      | 30.2                              | C                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | 97.4                              | <b>F<sup>3</sup></b> |

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized and all-way stop intersections, delay results show the average for the entire intersection. For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

1 - With the changes brought about by SB 743, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020 and the Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance will be used in determining the need for roadway improvements on Caltrans facilities. **The recommended improvements are for informational purposes only and would allow for the intersection to meet the City of Hanford LOS criteria.**

2 Installation of a traffic signal would alleviate LOS deficiencies at the intersection. A traffic signal is not recommended given the close spacing of adjacent intersections.

3 Improvements to the intersection aren't recommended given the presence of abutting commercial development at the intersection.

4 Intersection does not meet the peak hour traffic signal warrant.

++ Delay Exceeds 300 seconds.

**Table E-5**

**Table E-5**  
**Segment Operations with Mitigation**

| STREET SEGMENT              | TARGET LOS | PEAK HOUR | CUMULATIVE YEAR 2042 PLUS PROJECT |     |
|-----------------------------|------------|-----------|-----------------------------------|-----|
|                             |            |           | VOLUME                            | LOS |
| Lacey Boulevard             |            |           |                                   |     |
| Campus Drive to 11th Avenue | D          | AM        | 1,553                             | C   |
|                             |            | PM        | 2,970                             | E * |
| 7th Street                  |            |           |                                   |     |
| Campus Drive to 11th Avenue | D          | AM        | 567                               | D   |
|                             |            | PM        | 1,186                             | E * |

\* Capacity Increasing Improvements to the roadway segment aren't recommended given the presence of abutting commercial development.

**Table E-6**  
**Cumulative Year 2042 Equitable Share Responsibility**

| INTERSECTION                                    | PEAK HOUR | PROJECT TRIPS | CUMULATIVE YEAR 2042 PLUS PROJECT | FAIR SHARE PERCENTAGE |
|-------------------------------------------------|-----------|---------------|-----------------------------------|-----------------------|
| Campus Drive / 7th Street                       | AM        | 193           | 1,098                             | 17.6%                 |
|                                                 | PM        | 223           | 1,830                             | 12.2%                 |
| <b>ROADWAY SEGMENT</b>                          |           |               |                                   |                       |
| 7th Street between Campus Drive and 11th Avenue | AM        | 32            | 567                               | 5.6%                  |
|                                                 | PM        | 37            | 1,186                             | 3.1%                  |

## 1.0 Introduction

### 1.1 Description of the Region/Project

This Traffic Impact Study (TIS) has been prepared for the purpose of analyzing traffic conditions related to the Hanford Place Development (Project). The various components of the Project are detailed in Table 1-1 below. The Project site is generally bound to the north by the San Joaquin Valley Railroad, to the east by commercial land uses, to the south by State Route 198, and to the west by commercial land uses. Regional access to the site is provided by State Route 198, which is located adjacent to the southern border of the project site. Figure 1-1 shows the site's regional context. Figure 1-2 shows the Project location within the City of Hanford.

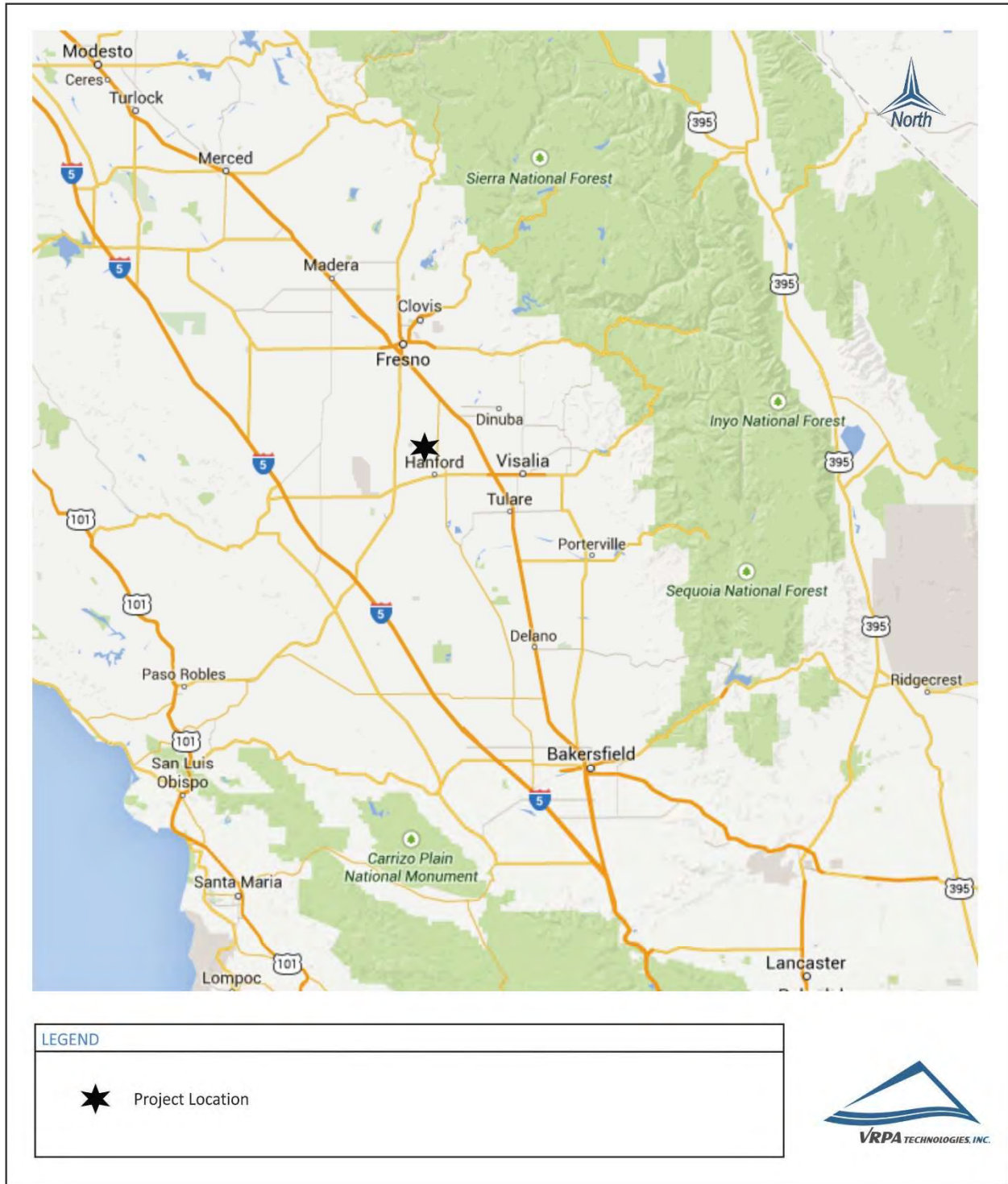
The vacant project site is comprised of four parcels and is located between State Route 198 and the San Joaquin Valley Railroad in the City of Hanford (City), in Kings County (Kings). 5th Street cuts through the project site in an east/west direction and Campus Drive cuts through the project in a north/south direction. In addition, the Peoples Ditch runs through the project site.

**Table 1-1**  
**Project Components**

| PROJECT COMPONENTS          | SIZE/UNIT  | DESCRIPTION                                                                                                                                                                                                                                                                            |
|-----------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambulatory Surgery Center   | 22,525 sf  | This facility is used to handle approximately 25 surgical procedures per day. There will be approximately 12 employees. This only operates weekdays.                                                                                                                                   |
| Specialty Clinic            | 12,445 sf  | This will be an Office of Statewide Health Planning and Development's (OSHPD) 3 facility, which in turn will approve advanced scope for medical care (i.e.: radiology/oncology. This will be a Monday-Saturday facility.                                                               |
| Medical Office Building     | 24,890 sf  | This will be standard weekday medical offices.                                                                                                                                                                                                                                         |
| Psychiatric Health Facility | 12,445 sf  | This is a psychiatric health care facility. This will consist of 24 patients who stay an average of 5 days. There will be approximately 10 employees and this use will operate 24/7. There will be approximately 4 admissions/discharges per day all done via ambulance.               |
| Hotel & Conference Center   | 105 Rooms  | This will be a standard traffic count for hotels and will be a limited service hotel. The conference center will be used on an average of 2 times per week including weekends.                                                                                                         |
| Nursing College             | 35,000 sf  | This is a m-sat operation. The School hosts 4 classes per scheduling window and offer three scheduling windows per day. Average class length is 2.5 hours. Average student enrollment is 8 students per class. Total classes of 12 per day and start at 8am and finish at 930pm.       |
| Skilled Nursing Facility    | 54,611 sf  | Skilled nursing facility with average of 1.5 admits per day and 1 discharge per day. Staff ratio of 1:6 with a total of 59 beds. It is a 24/7 operation and there are usually approximately 20 visitors/service provider visits per day. No patients/residents have access to vehicles |
| Memory Care                 | 34,480 sf  | Like above SNF, however longer length of stay (average stay of 45 days) so less vehicle traffic inbound and outbound. Same staff ratio and same visit count by visitors/service providers.                                                                                             |
| Assisted Living Facility    | 34,380 sf  | Limited use of vehicles for residents. On average ¼ of residents have vehicles parked full time at facility. Majority of residents use facilities bus transportation. This is 24/7 as well and staff ratio is 1:8.                                                                     |
| Multi-Family Apartment      | 90 Units   | Standard                                                                                                                                                                                                                                                                               |
| Medical/Commercial          | 114,000 sf | This will be standard weekday medical offices.                                                                                                                                                                                                                                         |

**Hanford Place Development**  
**Regional Location**

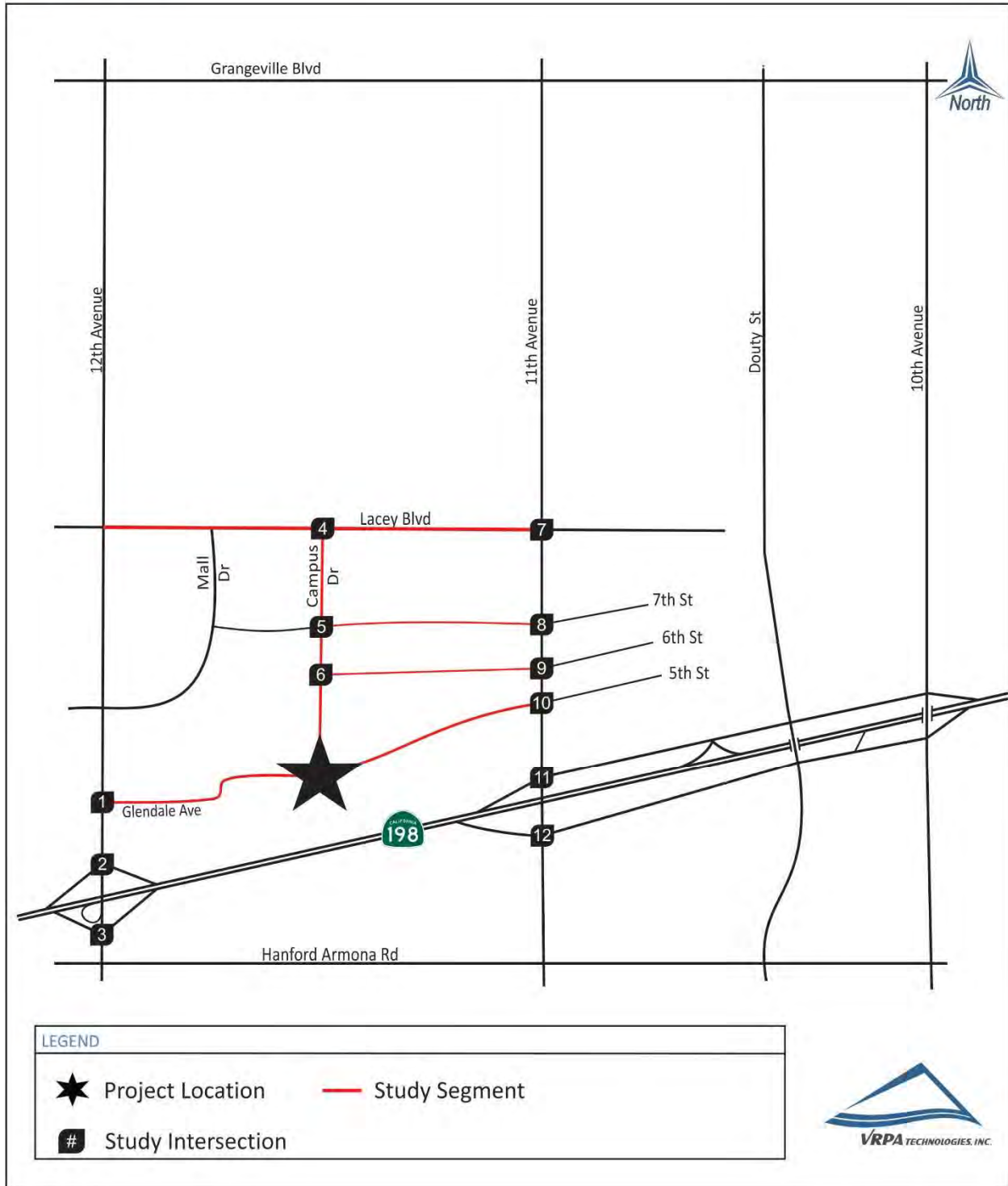
**Figure**  
**1-1**





**Hanford Place Development  
Project Location**

**Figure  
1-2**



### 1.1.1 Project Access

Vehicular access to the site would be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right of way. The proposed project would also construct a roundabout, which would also be dedicated as public right of way and would be constructed to Caltrans or City-approved standards. As part of the project, Glendale Avenue would be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle would be removed, and Glendale Avenue would be realigned using speed-specific design curves. Any new portions of Glendale Avenue would be dedicated as public right of way and any portion of existing right of way not used would be abandoned. 5th Street would be extended starting at the existing alignment before realigning to the roundabout. In addition, the proposed project would provide 1,466 parking spaces throughout the project site.

### 1.1.2 Study Area

The study intersections and roadway segments included in this TIS are listed below and shown in Figure 1-2. The study area outlined below was developed in consultation with City of Hanford staff.

#### Intersections

- ✓ 12<sup>th</sup> Avenue / Glendale Avenue
- ✓ 12<sup>th</sup> Avenue / SR 198 WB Ramps
- ✓ 12<sup>th</sup> Avenue / SR 198 EB Ramps
- ✓ Campus Drive / Lacey Boulevard
- ✓ Campus Drive / 7<sup>th</sup> Street
- ✓ Campus Drive / 6<sup>th</sup> Street
- ✓ 11<sup>th</sup> Avenue / Lacey Boulevard
- ✓ 11<sup>th</sup> Avenue / 7<sup>th</sup> Street
- ✓ 11<sup>th</sup> Avenue / 6<sup>th</sup> Street
- ✓ 11<sup>th</sup> Avenue / 5<sup>th</sup> Street
- ✓ 11<sup>th</sup> Avenue / 4<sup>th</sup> Street-SR 198 WB On Ramp
- ✓ 11<sup>th</sup> Avenue / 3<sup>rd</sup> Street-SR 198 EB Off Ramp

#### Segments

- ✓ Lacey Boulevard
  - 12<sup>th</sup> Avenue to Campus Drive
  - Campus Drive to 11<sup>th</sup> Avenue
- ✓ 7<sup>th</sup> Street
  - Campus Drive to 11<sup>th</sup> Avenue

- ✓ 6th Street
  - Campus Drive to 11<sup>th</sup> Avenue
- ✓ Glendale Avenue
  - East of 12<sup>th</sup> Avenue
- ✓ 5<sup>th</sup> Avenue
  - West of 11<sup>th</sup> Avenue
- ✓ Campus Drive
  - Lacey Boulevard to Glendale Avenue

### 1.1.3 Study Scenarios

The TIS completed for the Project includes level of service (LOS) analysis for the following traffic scenarios.

- ✓ Existing Conditions
- ✓ Existing Plus Project
- ✓ Near-Term Plus Project
- ✓ Cumulative Year 2042 Without Project
- ✓ Cumulative Year 2042 Plus Project

## 1.2 Methodology

When preparing a TIS, guidelines set by affected agencies are followed. In analyzing street and intersection capacities the Level of Service (LOS) methodologies are applied. LOS standards are applied by transportation agencies to quantitatively assess a street and highway system's performance. In addition, safety concerns are analyzed to determine the need for appropriate mitigation resulting from increased traffic near sensitive uses, the need for dedicated ingress and egress access lanes to the project, and other evaluations such as the need for signalized intersections or other improvements. Guidelines incorporated in the Highway Capacity Manual (HCM), 6<sup>th</sup> Edition, published in 2016 were also used in the development of this TIS.

### 1.2.1 Intersection Analysis

Intersection LOS analysis was conducted using the Synchro software program. Synchro supports HCM methodologies and is deemed an acceptable program by City of Hanford staff for assessment of traffic impacts. Levels of Service can be determined for both signalized and unsignalized intersections.

Tables 1-2 and 1-3 indicate the ranges in the amounts of average delay for a vehicle at signalized and unsignalized intersections for the various levels of service ranging from LOS "A" to "F".

The signalized LOS standards applied to calculate intersection LOS are in accordance with the current edition of the HCM. Intersection turning movement counts and roadway geometrics used to develop LOS calculations were obtained from field review findings and count data provided from the traffic count sources identified in Section 2.1.

When an unsignalized intersection does not meet acceptable LOS standards, the investigation of the need for a traffic signal shall be evaluated. The latest edition of the California Manual on Uniform Traffic Control Devices for Streets and Highways (California MUTCD) introduces standards for determining the need for traffic signals. The California MUTCD indicates that the satisfaction of one or more traffic signal warrants does not in itself require the installation of a traffic signal. In addition to the warrant analysis, an engineering study of the current or expected traffic conditions should be conducted to determine whether the installation of a traffic signal is justified. The California MUTCD Peak Hour Warrant (Warrant 3) was used to determine if a traffic signal is warranted at unsignalized intersections that fall below current LOS standards.

### 1.2.2 Roadway Segment Analysis

According to the HCM, LOS is categorized by two parameters of traffic: uninterrupted and interrupted flow. Uninterrupted flow facilities do not have fixed elements such as traffic signals that cause interruptions in traffic flow. Interrupted flow facilities do have fixed elements that cause an interruption in the flow of traffic, such as stop signs and signalized intersections along arterial roads. A roadway segment is defined as a stretch of roadway generally located between signalized or controlled intersections.

Segment LOS is important in order to understand whether the capacity of a roadway can accommodate future traffic volumes. Table 1-4 provides a definition of segment LOS. The performance criteria used for evaluating volumes and capacities on the road and highway system for this study were estimated using the Modified HCM-Based LOS Tables which are widely accepted throughout the central valley, including Kings County. The tables consider the capacity of individual road and highway segments based on numerous roadway variables (design speed, passing opportunities, signalized intersections per mile, number of lanes, saturation flow, etc.). These variables were identified and applied to reflect segment LOS conditions. Street segment capacity was determined using information shown in Table 1-5 which comes from the Modified Arterial Level of Service Tables included in Appendix A.

**Table 1-2**  
**Signalized Intersections**  
**Level of Service Definitions**  
**(Highway Capacity Manual)**

| LEVEL OF SERVICE | DEFINITION                                                                                                                                                                                                                                                                                                                    |                                                                                       | AVERAGE TOTAL DELAY (sec/veh) |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------|
| <b>A</b>         | Describes operations with very low delay. This level of service occurs when there is no conflicting traffic for a minor street.                                                                                                                                                                                               |    | $\leq 10.0$                   |
| <b>B</b>         | Describes operations with moderately low delay. This level generally occurs with a small amount of conflicting traffic causing higher levels of average delay.                                                                                                                                                                |    | $> 10.0 - 20.0$               |
| <b>C</b>         | Describes operations with average delays. These higher delays may result from a moderate amount of minor street traffic. Queues begin to get longer.                                                                                                                                                                          |    | $> 20.0 - 35.0$               |
| <b>D</b>         | Describes a crowded operation, with below average delays. At level D, the influence of congestion becomes more noticeable. Longer delays may result from shorter gaps on the mainline and an increase of minor street traffic. The queues of vehicles are increasing.                                                         |   | $> 35.0 - 55.0$               |
| <b>E</b>         | Describes operations at or near capacity. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor gaps for the minor street to cross and large queues.                                                                                                 |  | $> 55.0 - 80.0$               |
| <b>F</b>         | Describes operations that are at the failure point. This level, considered to be unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of the intersection. Insufficient gaps of suitable size exist to allow minor traffic to cross the intersection safely. |  | $> 80.0$                      |



**Table 1-3**  
**Unsignalized Intersections**  
**Level of Service Definitions**  
**(Highway Capacity Manual)**

| LEVEL OF SERVICE | DEFINITION                                                                                                        |                                                                                       | AVERAGE TOTAL DELAY (sec/veh) |
|------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------|
| A                | No delay for stop-controlled approaches.                                                                          |    | 0 - 10.0                      |
| B                | Describes operations with minor delay.                                                                            |    | > 10.0 - 15.0                 |
| C                | Describes operations with moderate delays.                                                                        |    | > 15.0 - 25.0                 |
| D                | Describes operations with some delays.                                                                            |   | > 25.0 - 35.0                 |
| E                | Describes operations with high delays and long queues.                                                            |  | > 35.0 - 50.0                 |
| F                | Describes operations with extreme congestion, with very high delays and long queues unacceptable to most drivers. |  | > 50.0                        |

**Table 1-4**  
**Roadway Segment**  
**Level of Service Definitions**  
**(Highway Capacity Manual)**

| LEVEL OF SERVICE | DEFINITION                                                                                                                                                                                                                                                                                                                    |                                                                                       |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>A</b>         | Represents free flow. Individual vehicles are virtually unaffected by the presence of others in the traffic stream.                                                                                                                                                                                                           |    |
| <b>B</b>         | Is in the range of stable flow, but the presence of other vehicles in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.                                                                                        |    |
| <b>C</b>         | Is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual vehicles becomes significantly affected by interactions with other vehicles in the traffic stream.                                                                                                          |   |
| <b>D</b>         | Is a crowded segment of roadway with a large number of vehicles restricting mobility and a stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.                                                                                  |  |
| <b>E</b>         | Represents operating conditions at or near the level capacity. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.                                                                                                                              |  |
| <b>F</b>         | Is used to define forced or breakdown flow (stop-and-go gridlock). This condition exists when the amount of traffic approaches a point where the amount of traffic exceeds the amount that can travel to a destination. Operations within the queues are characterized by stop and go waves, and they are extremely unstable. |  |

**Table 1-5**  
**Peak Hour Two-Way Volumes**

| Lanes | Division  | Level of Service |       |       |       |
|-------|-----------|------------------|-------|-------|-------|
|       |           | B                | C     | D     | E     |
| 2     | Undivided | *                | 324   | 1,125 | 1,521 |
| 2     | Divided   | *                | 340   | 1,181 | 1,597 |
| 4     | Undivided | 77               | 2,083 | 2,763 | 2,890 |
| 4     | Divided   | 81               | 2,205 | 2,925 | 3,060 |
| 6     | Divided   | 135              | 3,339 | 4,401 | 4,617 |

\* Cannot be achieved using table input value defaults.

### 1.3 Policies to Maintain Level of Service

#### 1.3.1 City of Hanford

An important goal is to maintain acceptable levels of service along the highway, street, and road network. To accomplish this, the City of Hanford adopts minimum levels of service to control congestion that may result as new development occurs.

The City of Hanford General Plan Circulation Element states: “The City of Hanford has adopted an overall LOS standard of C with peak hour LOS standard of D acceptable in some instances. Due to the nature of the roadway system, improvements to existing developed areas are extremely difficult. As a result, there may be instances where a lower LOS is acceptable.”

The City of Hanford General Plan Objective CI 2 states: “Provide timely and effective means of programming and constructing street and highway improvements to maintain an overall Level of Service of “C”, with a peak hour Level of Service of “D” as defined in the Highway Capacity Manual (published by the Transportation Research Board of the National Research Council) or better unless the City’s design considerations or other public health, safety, or welfare factors determine otherwise.”

The City of Hanford General Plan Policy CI 2.2 states: “Street improvements shall be prioritized with emphasis on current and forecasted service levels. Roadways experiencing or forecasted to experience conditions less than Level-of-Service “D” shall require improvements, unless the City’s design considerations or other public health, safety or welfare factors determine otherwise.”

#### 1.3.2 California Department of Transportation (Caltrans)

With the changes brought about by SB 743, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, the focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020 and the

Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance was used in determining the need for roadway improvements on Caltrans facilities.

## 1.4 VMT Analysis

Senate Bill 743 (SB 743) went into effect throughout California on July 1, 2020. This legislation changed the performance measure for CEQA transportation studies from level of service to vehicle miles traveled (VMT). An assessment of potential VMT impacts associated with the Project is provided in Chapter 3 to address changes in CEQA requirements.

Since the City of Hanford has not adopted methodologies or thresholds for VMT analyses related to SB 743, the VMT analysis was conducted using statewide guidance provided by the Governor's Office of Planning and Research (OPR) in their Technical Advisory on Evaluating Transportation Impacts in CEQA (OPR, December 2018). OPR recommends comparing project VMT/capita and VMT/employee to regional averages to determine the level of significance of project impacts. VMT/capita and VMT/employee values for the project as well as regional averaged were obtained from an online VMT analysis tool provided by the Kings County Association of Governments (KCAG).

## 2.0 Existing Conditions

### 2.1 Existing Traffic Counts and Roadway Geometrics

The first step toward assessing Project traffic impacts is to assess existing traffic conditions. Existing traffic counts were estimated considering the Kings County Association of Governments (KCAG) travel model and historic traffic counts in the study area given the on-going COVID-19 pandemic. Following is the methodology used for the development of existing traffic counts:

- ✓ A comparison of the KCAG base year and future year travel model showed that the growth in the study area is approximately 2% per year. The 2% per year growth rate was applied to historical ADT counts collected in the study area to estimate Year 2020 pre-COVID conditions.
- ✓ The estimated pre-COVID year 2020 ADT values (obtained using the 2% per year growth rate) were compared to October 2020 ADT values. Results of the comparison indicated that traffic counts taken in October 2020 ADT (i.e. during COVID) should be increased by a factor of 1.30 to estimate 2020 pre-COVID levels.
- ✓ Where intersection turning movement counts in years prior to 2020 are available, a 2% per year growth rate was applied to estimate year 2020 conditions.
- ✓ Where intersection turning movement counts are not available in years prior to 2020, a factor of 1.3 was applied to the October 2020 turning movement counts collected in the study area.

Traffic count data worksheets are provided in Appendix B.

### 2.2 Existing Functional Roadway Classification System

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the type of service they are intended to provide. Fundamental to this process is the recognition that individual streets and highways do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads.

The following are general descriptions of the roadway types shown in the City of Hanford Circulation Element:

- ✓ **State Freeways and Highways** – There are two state facilities serving the Hanford Planning Area, State Highway 198 and State Highway 43. The segment of State Highway 198, which passes through the Planning Area, is considered a freeway. State Highway 43 is a two-lane facility and functions as an arterial and major transportation route between Hanford and Fresno to the north and Corcoran to the south.



- ✓ **Arterial** – Hanford's arterial street pattern is generally one-mile spacing between the existing arterials. Exceptions to this spacing include Third, Fourth, Sixth and Seventh Streets, which are in the downtown area and provide for both mobility (to and through downtown), as well as access. These streets do not meet the right-of-way requirements or improvement standards for arterial streets; however, they function as arterial streets.
  - **Lacey Boulevard**
  - **12<sup>th</sup> Avenue**
  - **11<sup>th</sup> Avenue**
- ✓ **Collectors** – The streets shown below are designated as Collector streets, with their own set of development criteria. Similar to some Arterials, Collector streets have evolved from heavy use as opposed to formal development standards. Because of this, some streets may be designated Collectors, but not have all of the improvements required for new Collectors such as right-of-way width, travel way paving, and limited access.
  - **Campus Drive**
  - **7<sup>th</sup> Street**
  - **Glendale Avenue**
  - **5<sup>th</sup> Street**
- ✓ **Local Streets** – Roadways that provide access to individual homes and businesses. Local streets have one lane in each direction. Local streets connect single family homes and other uses not appropriate adjacent to major roadways, to the arterial-collector network.

## 2.3 Affected Streets and Highways

Street and highway intersections and segments near and adjacent to the Project site were analyzed to determine levels of service utilizing HCM-based methodologies described previously. The study intersections and street and highway segments included in this TIS are listed below. Counts were taken on Wednesday, July 18, 2018.

### Intersections

- ✓ 12<sup>th</sup> Avenue / Glendale Avenue
- ✓ 12<sup>th</sup> Avenue / SR 198 WB Ramps
- ✓ 12<sup>th</sup> Avenue / SR 198 EB Ramps
- ✓ Campus Drive / Lacey Boulevard
- ✓ Campus Drive / 7<sup>th</sup> Street
- ✓ Campus Drive / 6<sup>th</sup> Street
- ✓ 11<sup>th</sup> Avenue / Lacey Boulevard
- ✓ 11<sup>th</sup> Avenue / 7<sup>th</sup> Street
- ✓ 11<sup>th</sup> Avenue / 6<sup>th</sup> Street

- ✓ 11<sup>th</sup> Avenue / 5<sup>th</sup> Street
- ✓ 11<sup>th</sup> Avenue / 4<sup>th</sup> Street-SR 198 WB On Ramp
- ✓ 11<sup>th</sup> Avenue / 3<sup>rd</sup> Street-SR 198 EB Off Ramp

### Segments

- ✓ Lacey Boulevard
  - 12<sup>th</sup> Avenue to Campus Drive
  - Campus Drive to 11<sup>th</sup> Avenue
- ✓ 7<sup>th</sup> Street
  - Campus Drive to 11<sup>th</sup> Avenue
- ✓ 6<sup>th</sup> Street
  - Campus Drive to 11<sup>th</sup> Avenue
- ✓ Glendale Avenue
  - East of 12<sup>th</sup> Avenue
- ✓ 5<sup>th</sup> Avenue
  - West of 11<sup>th</sup> Avenue
- ✓ Campus Drive
  - Lacey Boulevard to Glendale Avenue

The existing lane geometry at study area intersections is shown in Figure 2-1. Figures 2-2 and 2-3 show existing traffic volumes for the AM and PM peak hours in the study area.

## 2.4 Level of Service

### 2.4.1 Intersection Capacity Analysis

All intersection LOS analyses were estimated using Synchro 10 Software. Various roadway geometrics, traffic volumes, and properties (peak hour factors, storage pocket length, etc) were input into the Synchro 10 Software program to accurately determine the travel delay and LOS for each Study scenario. The intersection LOS and delays reported represent the 6<sup>th</sup> Edition HCM outputs. Synchro assumptions, listed below, show the various Synchro inputs and methodologies used in the analysis.

- ✓ **Lane Geometry**
  - Storage lengths for turn lanes for existing intersections were obtained from aerial photos and rounded to the nearest 25 feet
  - VRPA conducted a field study of the specified intersections and segments to verify lane

geometry and intersection control as well as to obtain other pertinent data such as signal timing and phasing, where applicable.

✓ **Traffic Conditions**

- Peak hour factors (PHF) for each intersection approach was obtained from traffic counts in the study area and were utilized for Existing Conditions, Existing Plus Project, and Near-term (Opening Year) Plus Project conditions. For all future scenarios, a PHF of 0.92 was applied unless the existing PHF was greater than 0.92
- Heavy vehicle percentages were based on the HCM default
- Roadway link speed limits were observed in the field and input into the Synchro network to determine roadway link speeds
- Queuing conditions for left and right-turn lanes at all study intersections was based upon Section 400 of Caltrans' Highway Design Manual

Results of the analysis show that the 12<sup>th</sup> Avenue at Glendale Avenue intersection currently exceeds the City of Hanford's minimum level of service criteria during the PM peak hour. Table 2-1 shows the intersection LOS for the existing conditions. Synchro 10 (HCM 6<sup>th</sup> Edition) Worksheets are provided in Appendix C.

#### 2.4.2 *Queuing Analysis*

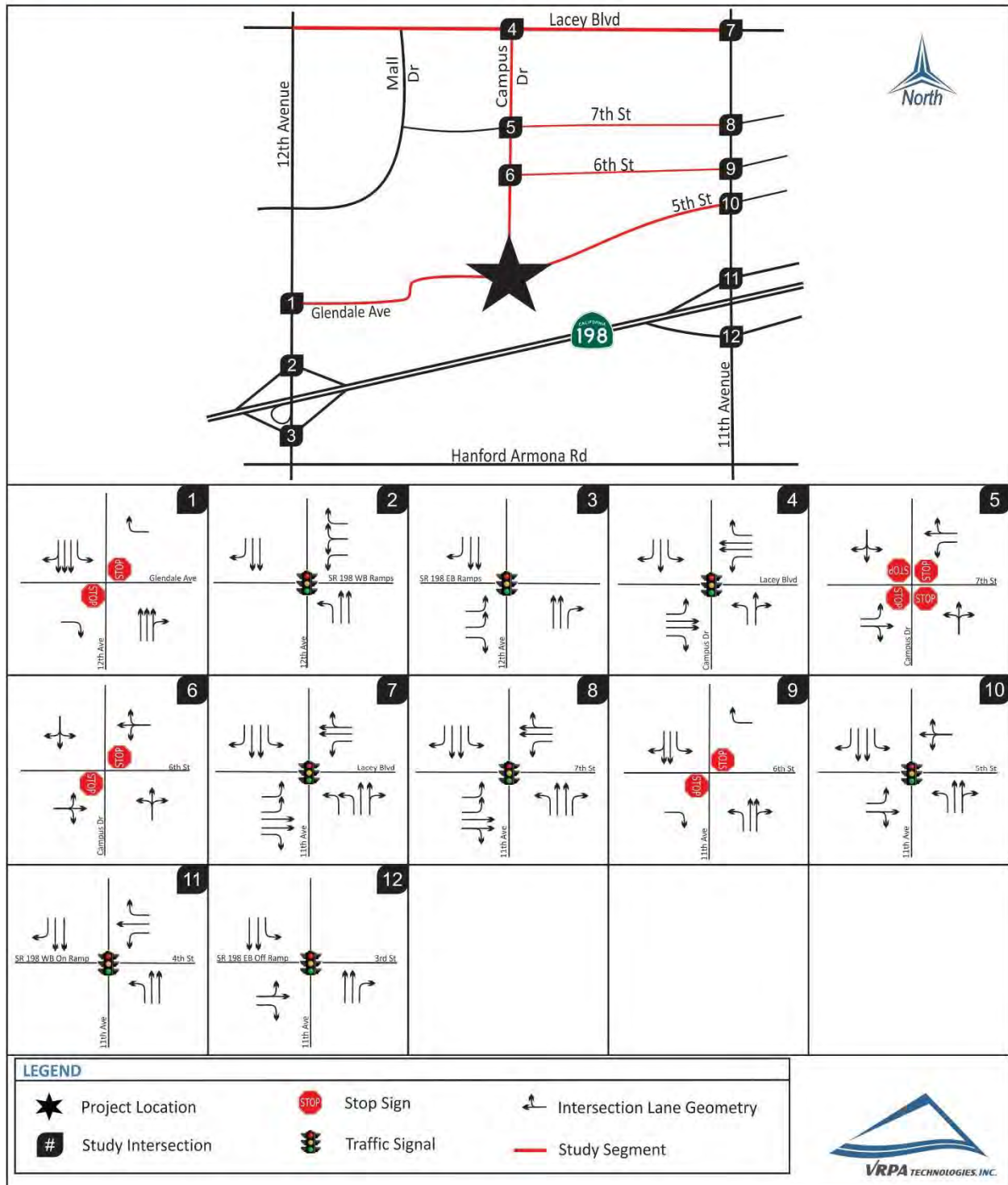
Table 2-2 provides a queue length summary for study intersections for the Existing scenario. Traffic queue lengths at an intersection or along a roadway segment assist in the determination of a roadway's overall performance. Excessive queuing at an intersection increases vehicle delay and reduces capacity. If a dedicated left turn lane doesn't provide adequate storage, vehicles will queue beyond the left turn storage pocket and into other travel lanes, thus increasing vehicle delay and reducing capacity. The queuing analyses is based upon methodology presented in Chapter 400 of Caltrans' Highway Design Manual (HDM), which is included in Appendix D. The queue results shown in Table 2-2 represent the approximate queue lengths for the respective lane movements.

#### 2.4.2 *Roadway Segment Capacity Analysis*

Results of the segment analysis along the existing street and highway system are reflected in Table 2-3. The performance criteria used for evaluating volumes and capacities on the road and highway system for this study were estimated using the Modified Arterial Level of Service Tables included in Table 1-5 and Appendix A. Results of the analysis show that study roadway segments are currently operating at acceptable levels of service.

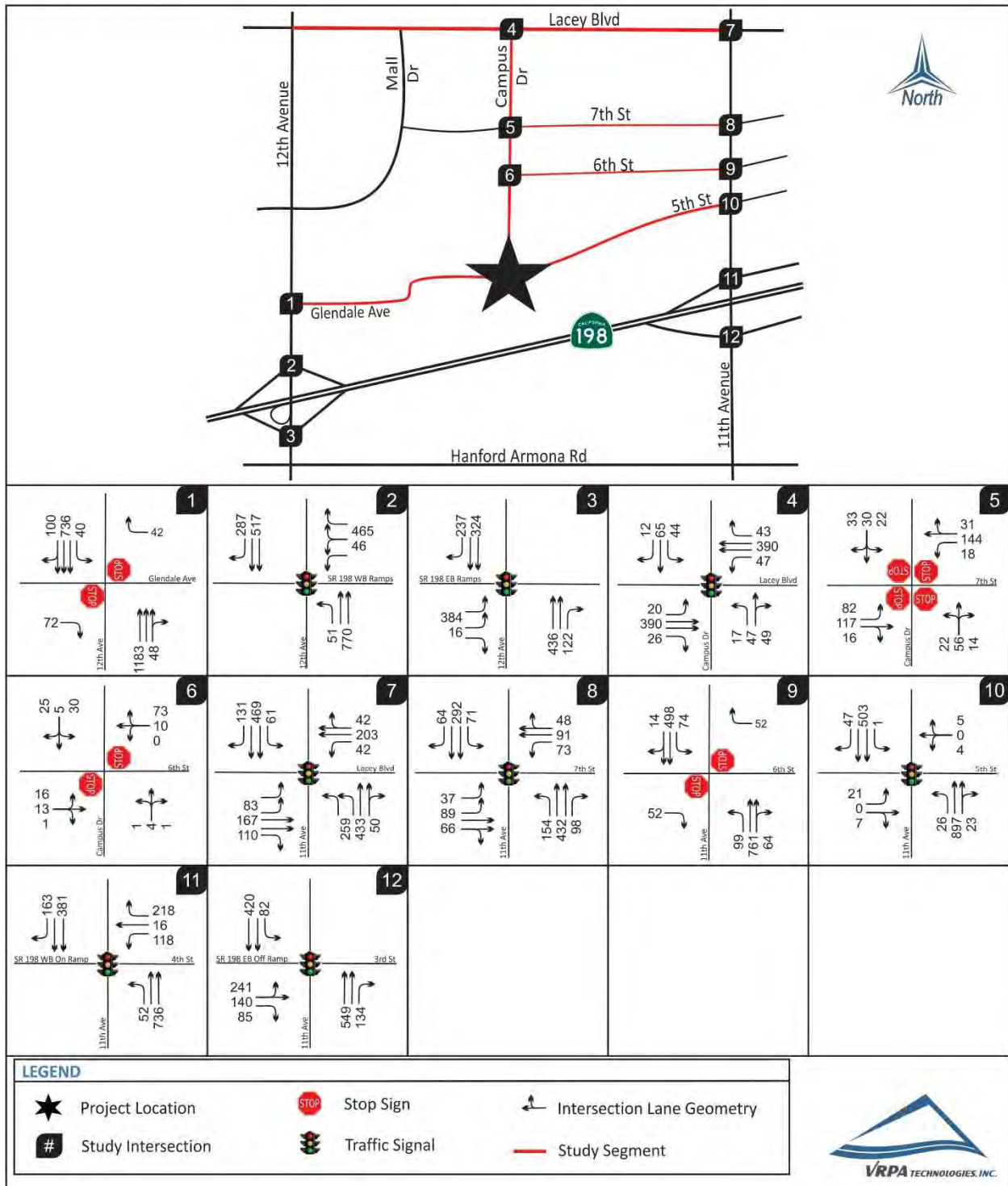
## Hanford Place Development Existing Lane Geometry

Figure  
2-1



## Hanford Place Development Existing AM Peak Hour Traffic

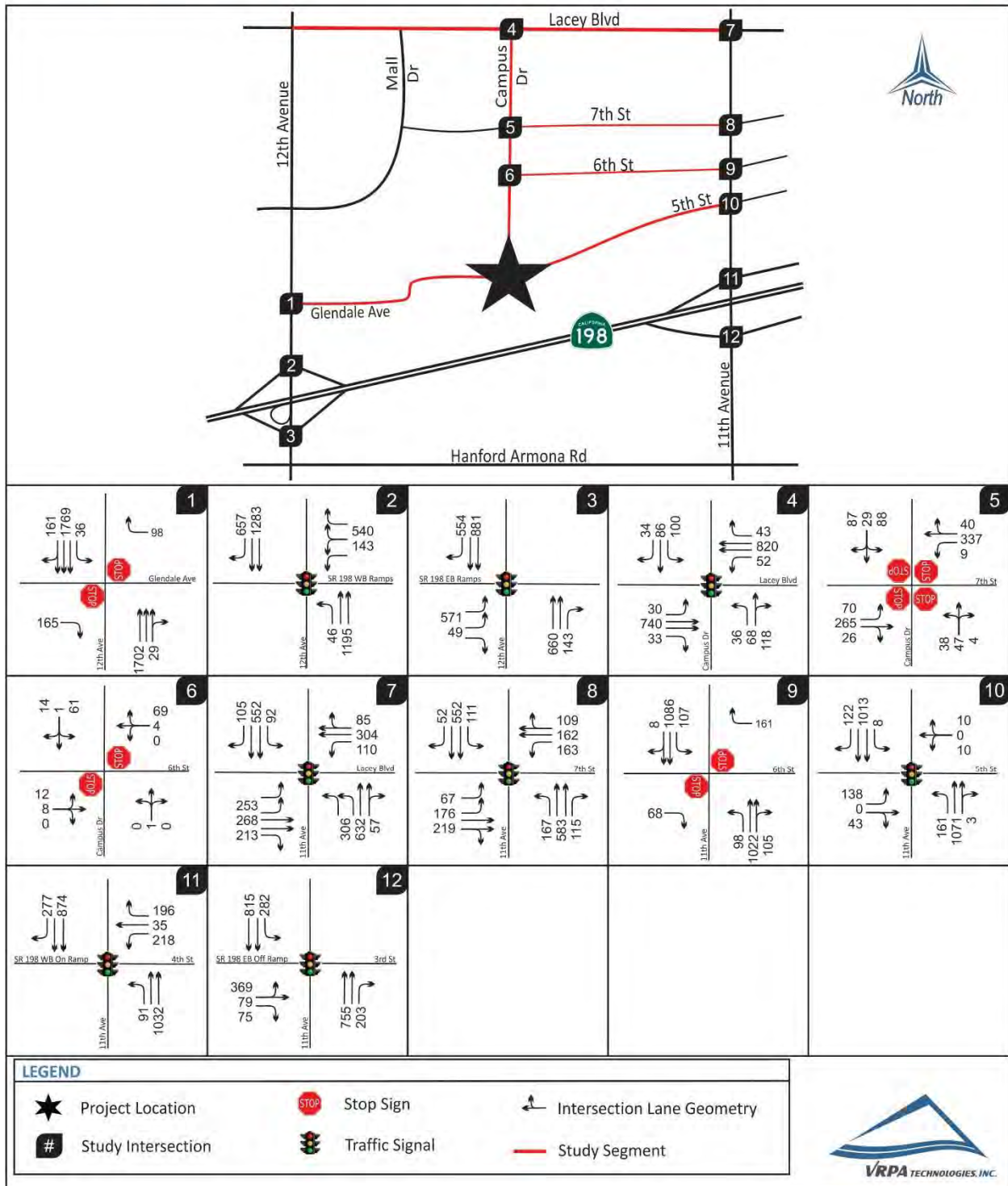
Figure  
2-2





## Hanford Place Development Existing PM Peak Hour Traffic

Figure  
2-3



**Table 2-1**  
**Existing Intersection Operations**

| INTERSECTION                                    | CONTROL           | TARGET LOS      | PEAK HOUR | EXISTING     |            |
|-------------------------------------------------|-------------------|-----------------|-----------|--------------|------------|
|                                                 |                   |                 |           | DELAY        | LOS        |
| 1. 12th Avenue / Glendale Avenue                | Two-Way Stop Sign | D               | AM        | 22.7         | C          |
|                                                 |                   |                 | PM        | <b>100.4</b> | <b>F +</b> |
| 2. 12th Avenue / SR 198 WB Ramps                | Signalized        | -- <sup>1</sup> | AM        | 13.8         | B          |
|                                                 |                   |                 | PM        | 17.8         | B          |
| 3. 12th Avenue / SR 198 EB Ramps                | Signalized        | -- <sup>1</sup> | AM        | 11.9         | B          |
|                                                 |                   |                 | PM        | 13.0         | B          |
| 4. Campus Drive / Lacey Boulevard               | Signalized        | D               | AM        | 25.0         | C          |
|                                                 |                   |                 | PM        | 28.0         | C          |
| 5. Campus Drive / 7th Street                    | All-Way Stop Sign | D               | AM        | 9.9          | A          |
|                                                 |                   |                 | PM        | 15.6         | C          |
| 6. Campus Drive / 6th Street                    | Two-Way Stop Sign | D               | AM        | 10.4         | B          |
|                                                 |                   |                 | PM        | 10.6         | B          |
| 7. 11th Avenue / Lacey Boulevard                | Signalized        | D               | AM        | 20.4         | C          |
|                                                 |                   |                 | PM        | 27.5         | C          |
| 8. 11th Avenue / 7th Street                     | Signalized        | D               | AM        | 18.9         | C          |
|                                                 |                   |                 | PM        | 28.8         | C          |
| 9. 11th Avenue / 6th Street                     | Two-Way Stop Sign | D               | AM        | 12.6         | B          |
|                                                 |                   |                 | PM        | 17.4         | C          |
| 10. 11th Avenue / 5th Street                    | Signalized        | D               | AM        | 4.9          | A          |
|                                                 |                   |                 | PM        | 12.1         | B          |
| 11. 11th Avenue / 4th Street-SR 198 WB On Ramp  | Signalized        | -- <sup>1</sup> | AM        | 12.0         | B          |
|                                                 |                   |                 | PM        | 12.7         | B          |
| 12. 11th Avenue / 3rd Street-SR 198 EB Off Ramp | Signalized        | -- <sup>1</sup> | AM        | 18.6         | B          |
|                                                 |                   |                 | PM        | 25.1         | C          |

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized and all-way stop intersections, delay results show the average for the entire intersection. For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

1 - With the changes brought about by SB 743, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020 and the Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance will be used in determining the need for roadway improvements on Caltrans facilities.

+ Meets peak hour signal warrants.

**Table 2-2**  
**Existing Queuing Operations**

| INTERSECTION                                | EXISTING QUEUE<br>STORAGE LENGTH (ft) |         | EXISTING<br>CONDITIONS |             |
|---------------------------------------------|---------------------------------------|---------|------------------------|-------------|
|                                             |                                       |         | AM<br>Queue            | PM<br>Queue |
| 12th Avenue / Glendale Avenue               | SB Left                               | 125     | 33                     | 30          |
| 12th Avenue / SR 198 WB Ramps               | NB Left                               | 400     | 43                     | 38          |
|                                             | WB Approach                           | 3 @ 275 | 426                    | 569         |
| 12th Avenue / SR 198 EB Ramps               | SB Right                              | 600     | 198                    | 462         |
|                                             | EB Left                               | 2 @ 875 | 320                    | 476         |
|                                             | EB Right                              | 850     | 13                     | 41          |
| Campus Drive / Lacey Boulevard              | NB Left                               | 75      | 14                     | 30          |
|                                             | SB Left                               | 200     | 37                     | 83          |
|                                             | SB Right                              | 100     | 10                     | 28          |
|                                             | EB Left                               | 200     | 17                     | 25          |
|                                             | EB Right                              | 100     | 22                     | 28          |
|                                             | WB Left                               | 125     | 39                     | 43          |
|                                             | WB Right                              | 100     | 36                     | 36          |
| Campus Drive / 7th Street                   | EB Left                               | 100     | 68                     | 58          |
|                                             | WB Left                               | 100     | 15                     | 8           |
| 11th Avenue / Lacey Boulevard               | NB Left                               | 2 @ 200 | 216                    | 255         |
|                                             | SB Left                               | 150     | 51                     | 77          |
|                                             | SB Right                              | 150     | 109                    | 88          |
|                                             | EB Left                               | 2 @ 125 | 69                     | 211         |
|                                             | EB Right                              | 100     | 92                     | <b>178</b>  |
|                                             | WB Left                               | 100     | 35                     | 92          |
| 11th Avenue / 7th Street                    | NB Left                               | 125     | <b>128</b>             | <b>139</b>  |
|                                             | NB Right                              | 100     | 82                     | 96          |
|                                             | SB Left                               | 100     | 59                     | 93          |
|                                             | SB Right                              | 100     | 53                     | 43          |
|                                             | EB Left                               | 2 @ 75  | 31                     | 56          |
|                                             | WB Left                               | 125     | 61                     | <b>136</b>  |
| 11th Avenue / 6th Street                    | NB Left                               | 75      | <b>83</b>              | <b>82</b>   |
|                                             | SB Left                               | 125     | 62                     | 89          |
| 11th Avenue / 5th Street                    | NB Left                               | 150     | 22                     | 134         |
|                                             | SB Left                               | 50      | 1                      | 7           |
|                                             | SB Right                              | 50      | 39                     | <b>102</b>  |
|                                             | EB Left                               | 50      | 18                     | <b>115</b>  |
| 11th Avenue / 4th Street-SR 198 WB On Ramp  | NB Left                               | 75      | 43                     | 76          |
|                                             | SB Right                              | 75      | <b>136</b>             | <b>231</b>  |
|                                             | WB Left                               | 125     | 98                     | <b>182</b>  |
| 11th Avenue / 3rd Street-SR 198 EB Off Ramp | NB Right                              | 75      | <b>112</b>             | <b>169</b>  |
|                                             | SB Left                               | 150     | 68                     | <b>235</b>  |
|                                             | EB Right                              | 25      | <b>71</b>              | <b>63</b>   |

Queue is measured in feet / **BOLD** denotes exceedance

**Table 2-3**  
**Existing Segment Operations**

| STREET SEGMENT                      | SEGMENT DESCRIPTION | TARGET LOS | PEAK HOUR | EXISTING |     |
|-------------------------------------|---------------------|------------|-----------|----------|-----|
|                                     |                     |            |           | VOLUME   | LOS |
| Lacey Boulevard                     |                     |            |           |          |     |
| 12th Avenue to Campus Drive         | 4 Lanes Divided     | D          | AM        | 855      | C   |
|                                     |                     |            | PM        | 1,693    | C   |
| Campus Drive to 11th Avenue         | 4 Lanes Divided     | D          | AM        | 963      | C   |
|                                     |                     |            | PM        | 1,873    | C   |
| 7th Street                          |                     |            |           |          |     |
| Campus Drive to 11th Avenue         | 2 Lanes Undivided   | D          | AM        | 346      | D   |
|                                     |                     |            | PM        | 743      | D   |
| 6th Street                          |                     |            |           |          |     |
| Campus Drive to 11th Avenue         | 2 Lanes Undivided   | D          | AM        | 127      | C   |
|                                     |                     |            | PM        | 142      | C   |
| Glendale Avenue                     |                     |            |           |          |     |
| East of 12th Avenue                 | 2 Lanes Undivided   | D          | AM        | 130      | C   |
|                                     |                     |            | PM        | 163      | C   |
| 5th Avenue                          |                     |            |           |          |     |
| West of 11th Avenue                 | 2 Lanes Undivided   | D          | AM        | 101      | C   |
|                                     |                     |            | PM        | 464      | D   |
| Campus Drive                        |                     |            |           |          |     |
| Lacey Bouloevard to Glendale Avenue | 2 Lanes Undivided   | D          | AM        | 251      | C   |
|                                     |                     |            | PM        | 393      | D   |

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

## 3.0 Traffic Impacts

This chapter provides an assessment of the traffic the Project is expected to generate and the impact of that traffic on the surrounding street system.

### 3.1 Trip Generation

To assess the impacts that the Project may have on the surrounding roadway network, the first step is to determine Project trip generation. Project trip generation was determined using trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition), the ITE Trip Generation Handbook (3rd Edition), information provided by the Project proponent, and engineering judgement. The considerations described above led to the recommended trip generation for weekday AM (7:00-9:00am) and PM (4:00-6:00pm) peak hours shown in Table 3-1.

**Table 3-1**  
**Project Trip Generation**

| LAND USE                                                                                 | Quantity     | DAILY TRIP ENDS (ADT) |              | WEEKDAY AM PEAK HOUR |              |            |            |            | WEEKDAY PM PEAK HOUR |              |            |            |            |
|------------------------------------------------------------------------------------------|--------------|-----------------------|--------------|----------------------|--------------|------------|------------|------------|----------------------|--------------|------------|------------|------------|
|                                                                                          |              | RATE                  | VOLUME       | RATE                 | IN:OUT SPLIT | VOLUME     |            |            | RATE                 | IN:OUT SPLIT | VOLUME     |            |            |
|                                                                                          |              |                       |              |                      |              | IN         | OUT        | TOTAL      |                      |              | IN         | OUT        | TOTAL      |
| Ambulatory Surgery Center <sup>1</sup>                                                   | 22,525 s.f.  | 6.57                  | 148          | 2.62                 | 78:22        | 46         | 13         | 59         | 1.33                 | 29:71        | 9          | 21         | 30         |
| Specialty Clinic (630)                                                                   | 12,445 s.f.  | 38.16                 | 475          | 3.69                 | 78:22        | 36         | 10         | 46         | 3.28                 | 29:71        | 13         | 31         | 44         |
| Medical Office Building (720)                                                            | 24,890 s.f.  | 34.91                 | 869          | 2.61                 | 78:22        | 51         | 14         | 65         | 3.46                 | 28:72        | 24         | 62         | 86         |
| Psychiatric Health Facility <sup>1</sup>                                                 | 12,445 s.f.  | 4.50                  | 56           | 1.77                 | 55:45        | 12         | 10         | 22         | 1.77                 | 45:55        | 10         | 12         | 22         |
| Hotel & Conference Center (310)                                                          | 105 Rooms    | 7.22                  | 758          | 0.45                 | 59:41        | 28         | 19         | 47         | 0.50                 | 51:49        | 27         | 26         | 53         |
| Nursing College (540)                                                                    | 35,000 s.f.  | 20.25                 | 709          | 2.07                 | 77:23        | 55         | 17         | 72         | 1.61                 | 50:50        | 32         | 33         | 65         |
| Skilled Nursing Facility (620)                                                           | 54,611 s.f.  | 6.64                  | 363          | 0.55                 | 78:22        | 23         | 7          | 30         | 0.59                 | 41:59        | 13         | 19         | 32         |
| Memory Care (620)                                                                        | 34,480 s.f.  | 6.64                  | 229          | 0.55                 | 78:22        | 15         | 4          | 19         | 0.59                 | 41:59        | 9          | 12         | 21         |
| Assisted Living Facility (254)                                                           | 34,380 s.f.  | 4.19                  | 144          | 0.38                 | 78:22        | 10         | 3          | 13         | 0.49                 | 30:70        | 5          | 12         | 17         |
| Multi-Family Apartment (220)                                                             | 90 Units     | 7.11                  | 640          | 0.48                 | 23:77        | 10         | 33         | 43         | 0.60                 | 63:37        | 34         | 20         | 54         |
| Medical/Commercial (720)                                                                 | 114,200 s.f. | 34.45                 | 3,934        | 2.63                 | 78:22        | 234        | 66         | 300        | 3.50                 | 28:72        | 112        | 288        | 400        |
| <b>SUBTOTAL TRIP GENERATION</b>                                                          |              |                       | <b>8,325</b> |                      |              | <b>520</b> | <b>196</b> | <b>716</b> |                      |              | <b>288</b> | <b>536</b> | <b>824</b> |
| <b>Internal Vehicle Trips (NCHRP Internal Trip Capture Estimation Tool) <sup>2</sup></b> |              |                       | <b>833</b>   |                      |              | <b>52</b>  | <b>20</b>  | <b>72</b>  |                      |              | <b>29</b>  | <b>54</b>  | <b>82</b>  |
| <b>TOTAL EXTERNAL TRIP GENERATION</b>                                                    |              |                       | <b>7,493</b> |                      |              | <b>468</b> | <b>176</b> | <b>644</b> |                      |              | <b>259</b> | <b>482</b> | <b>742</b> |

Source: Generation factors from ITE Trip Generation Manual, 10th Edition.  
Trip ends are one-way traffic movements, entering or leaving.  
The numbers in parenthesis are ITE land use codes.

1. Information provided by Project Representatives.

2. Internal trip capture rate = 10%.



### 3.2 Trip Distribution

Project trip distribution percentages for inbound and outbound traffic are shown in Figure 3-1a and 3-1b, respectively. These percentages are based upon knowledge of the study area, engineering judgement, prevailing traffic patterns in the study area, major routes, population centers, other existing development and review and comment by the City of Hanford and Caltrans.

Vehicular access to the site would be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right of way. The proposed project would also construct a roundabout, which would also be dedicated as public right of way and would be constructed to Caltrans or City-approved standards. As part of the project, Glendale Avenue would be realigned at the northwest corner of the Hanford Veterinary Hospital development. The existing knuckle would be removed, and Glendale Avenue would be realigned using speed-specific design curves. Any new portions of Glendale Avenue would be dedicated as public right of way and any portion of existing right of way not used would be abandoned. 5th Street would be extended starting at the existing alignment before realigning to the roundabout. In addition, the proposed project would provide 1,466 parking spaces throughout the project site.

### 3.3 Project Traffic

Project traffic as shown in Table 3-1 was distributed to the roadway system using the trip distribution percentages shown in Figures 3-1a and 3-1b. A graphical representation of the resulting AM and PM peak hour Project trips used is shown in Figures 3-2 and 3-3.

### 3.4 Existing Plus Project Traffic Conditions

An Existing Plus Project Scenario was analyzed to include existing traffic plus traffic generated by the Project. The resulting traffic is shown in Figures 3-4 and 3-5.

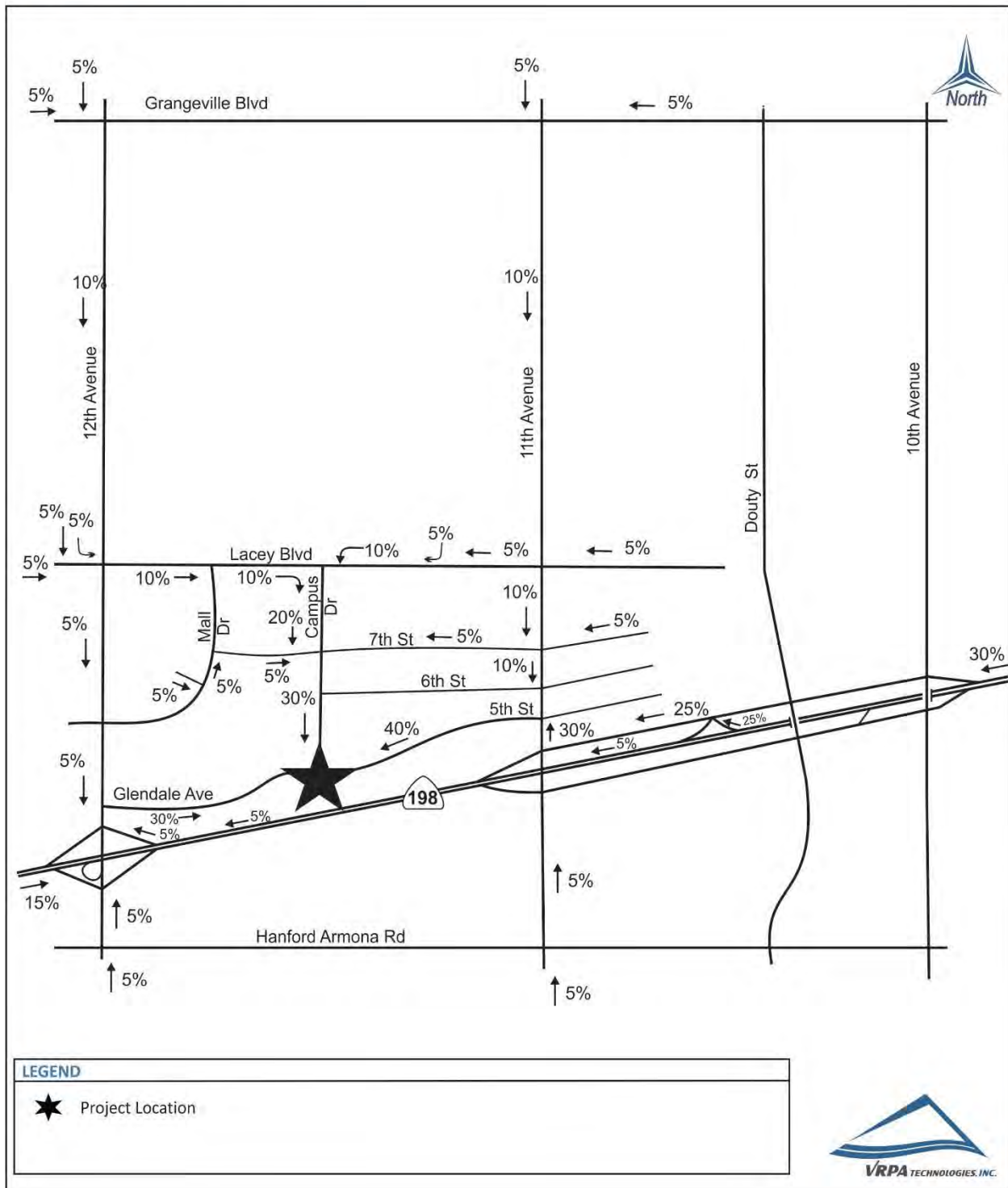
### 3.5 Near-Term Traffic Conditions

Traffic conditions with the Project in the Year 2024 were estimated by applying a growth rate of 2% per year to the existing traffic volumes. A comparison of the KCAG base year and future year travel model showed that the growth in the study area is approximately 2% per year.

The resulting traffic for the Near-Term scenario is shown in Figures 3-6 and 3-7.

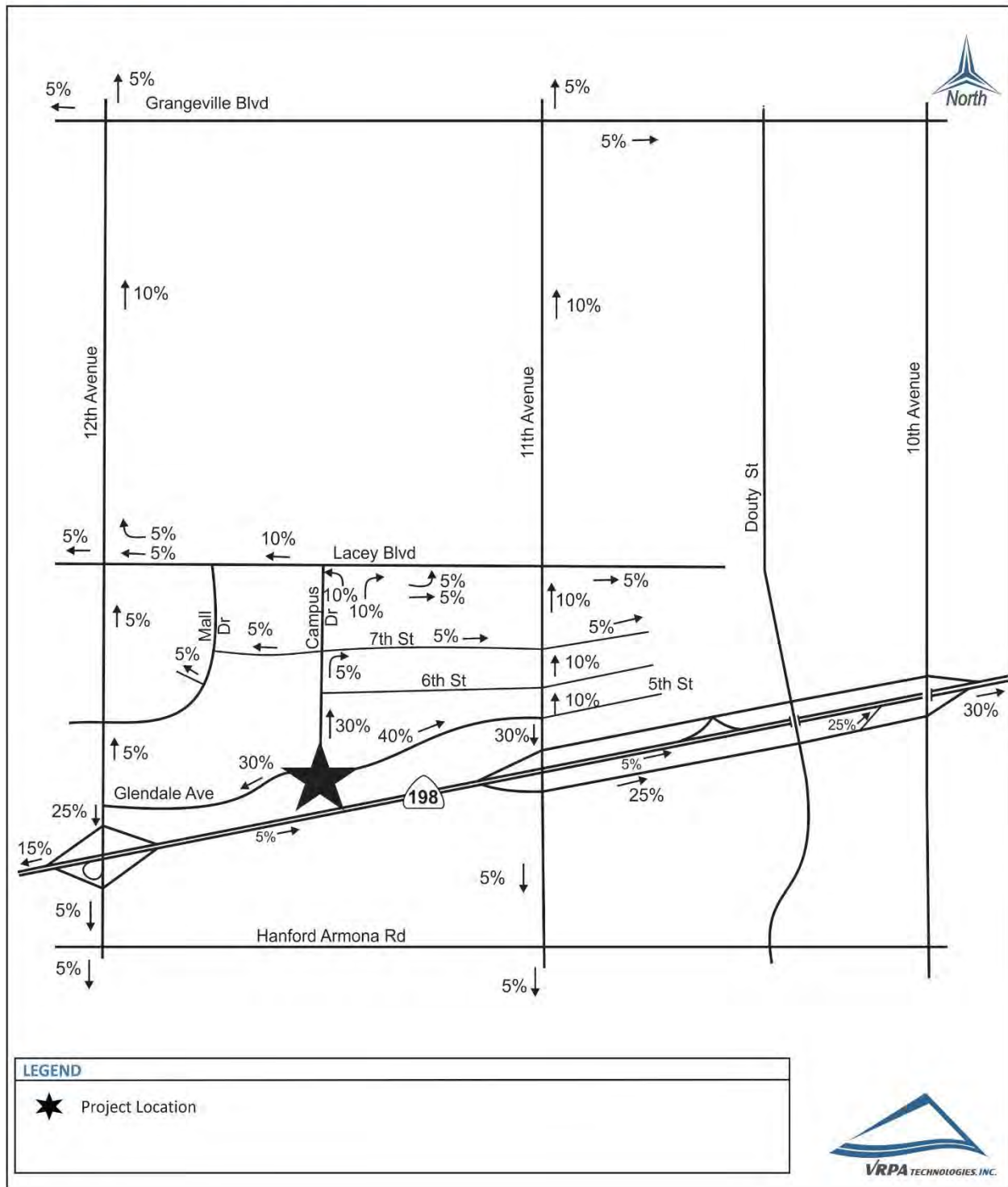
**Hanford Place Development**  
**Project Trip Distribution - Inbound**

**Figure**  
**3-1a**



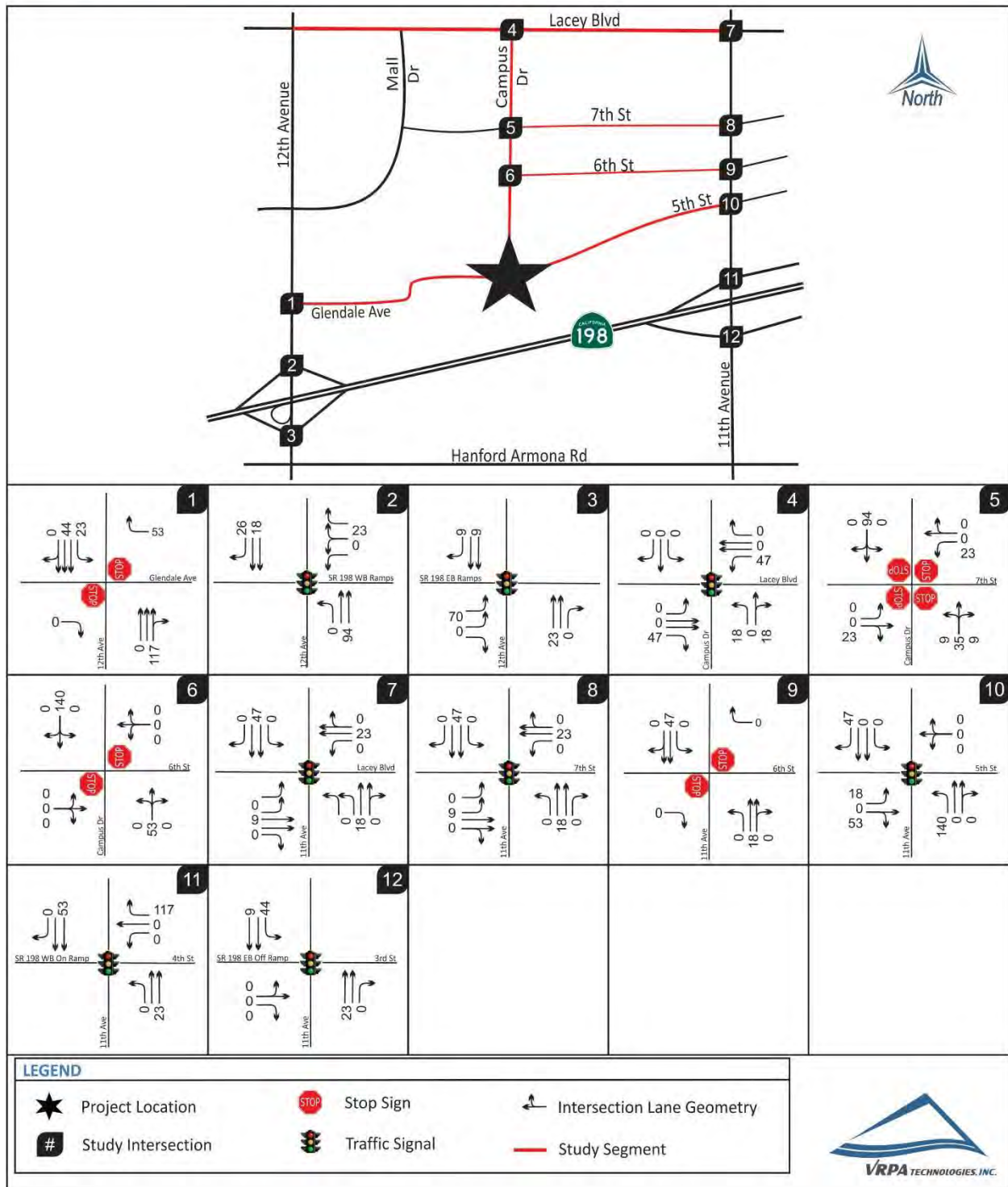
**Hanford Place Development**  
**Project Trip Distribution - Outbound**

**Figure**  
**3-1b**



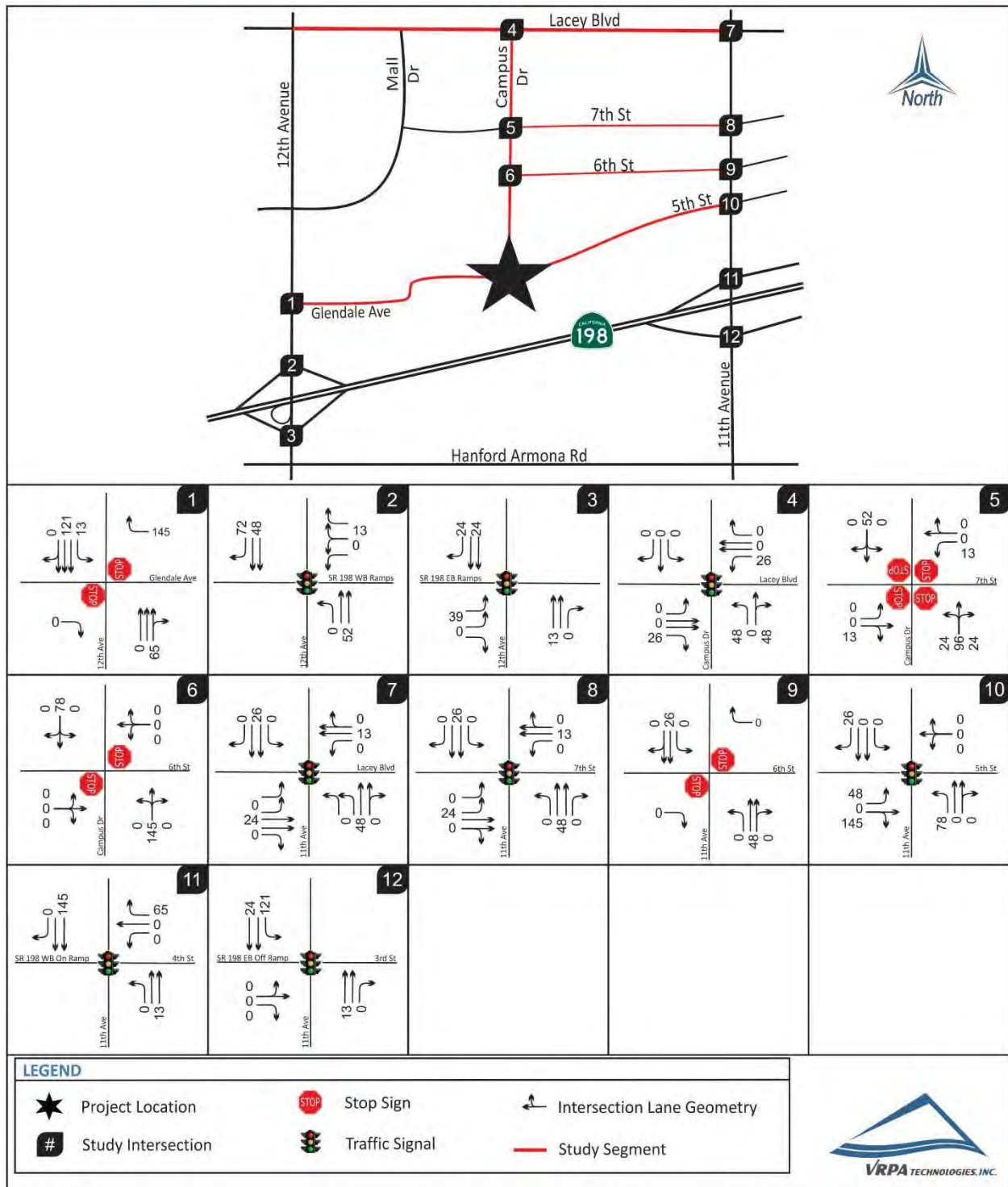
**Hanford Place Development**  
**AM Peak Hour Project Traffic**

**Figure**  
**3-2**



# Hanford Place Development PM Peak Hour Project Traffic

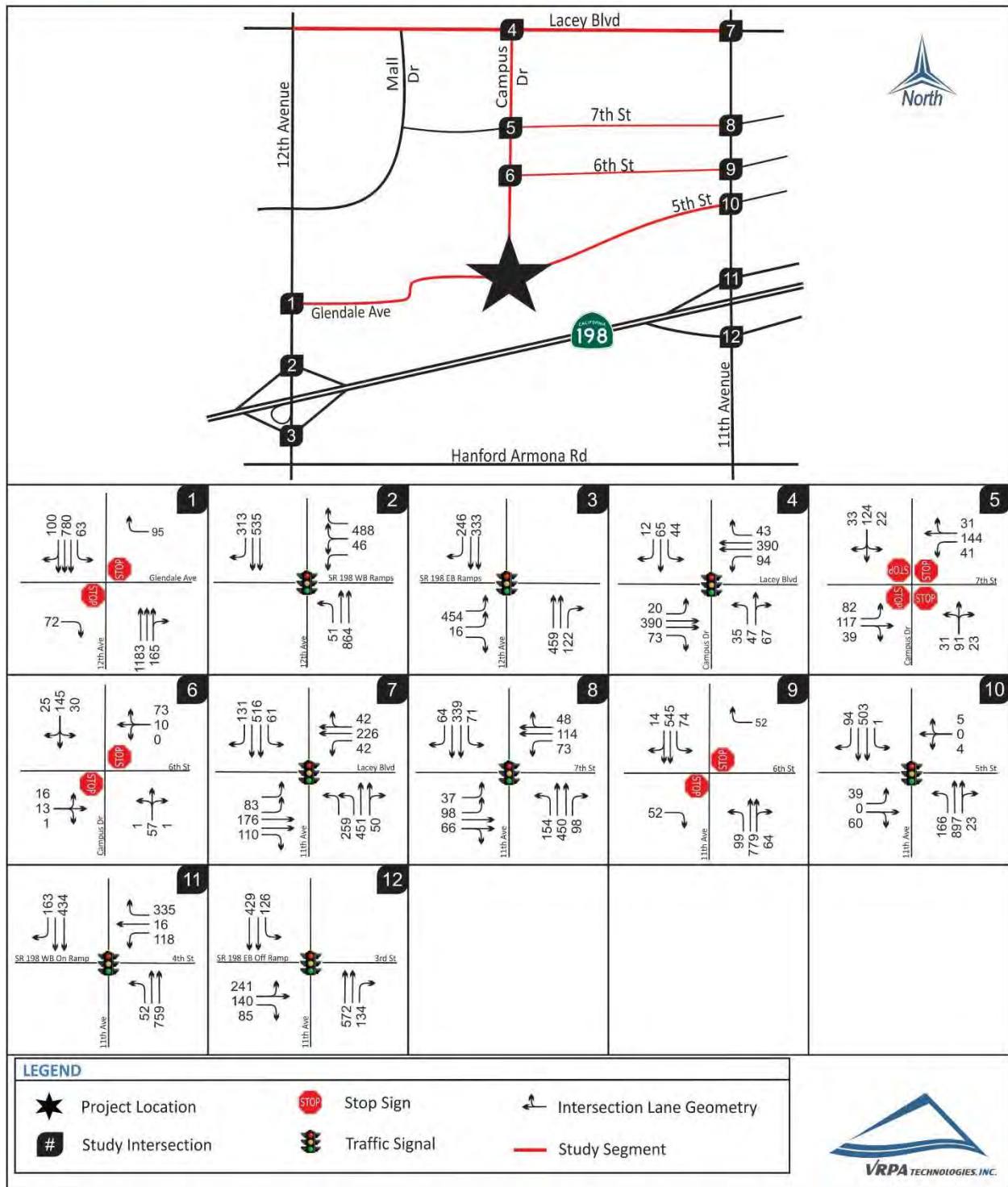
Figure  
3-3





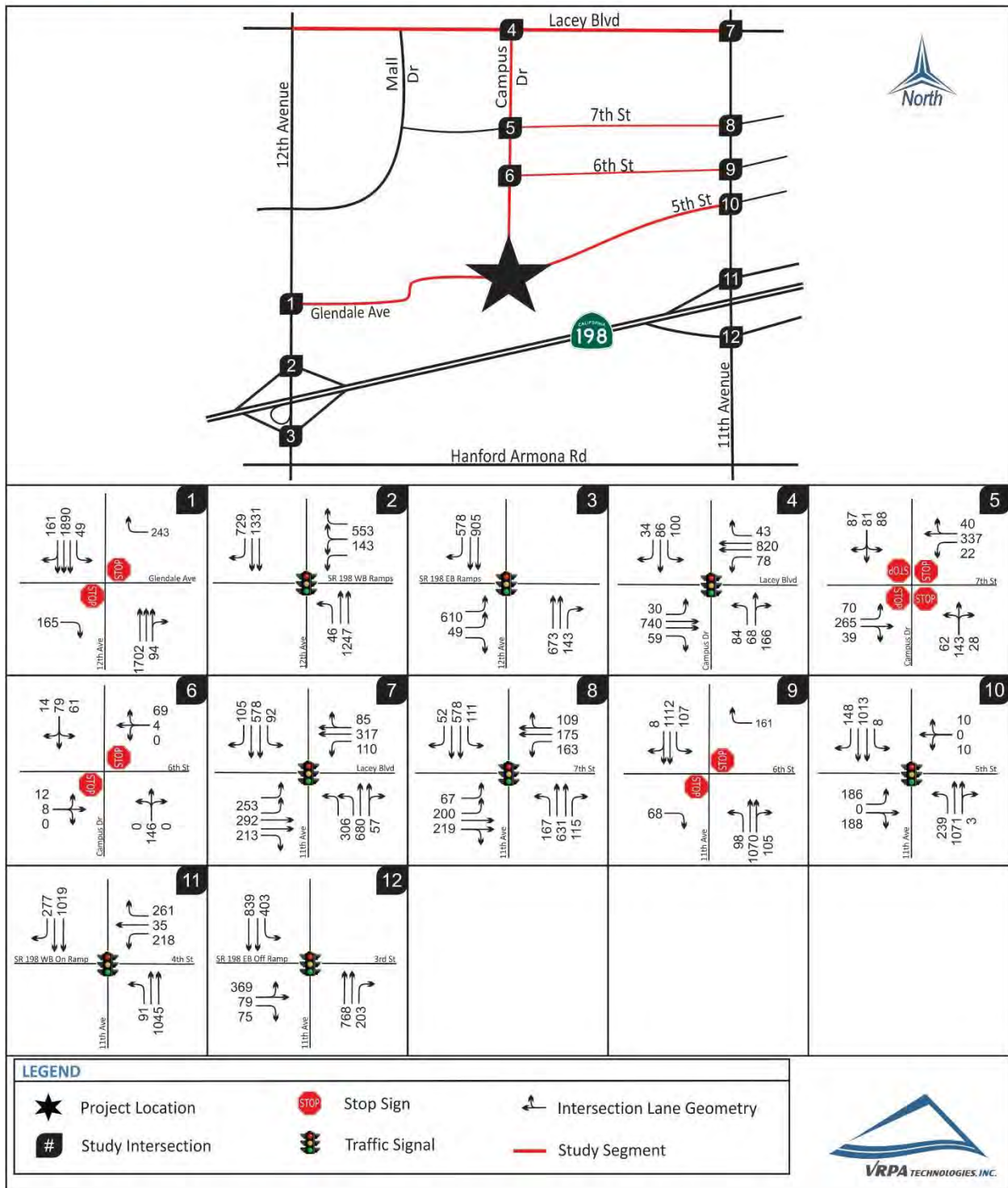
**Hanford Place Development**  
**Existing Plus Project AM Peak Hour Traffic**

**Figure**  
**3-4**



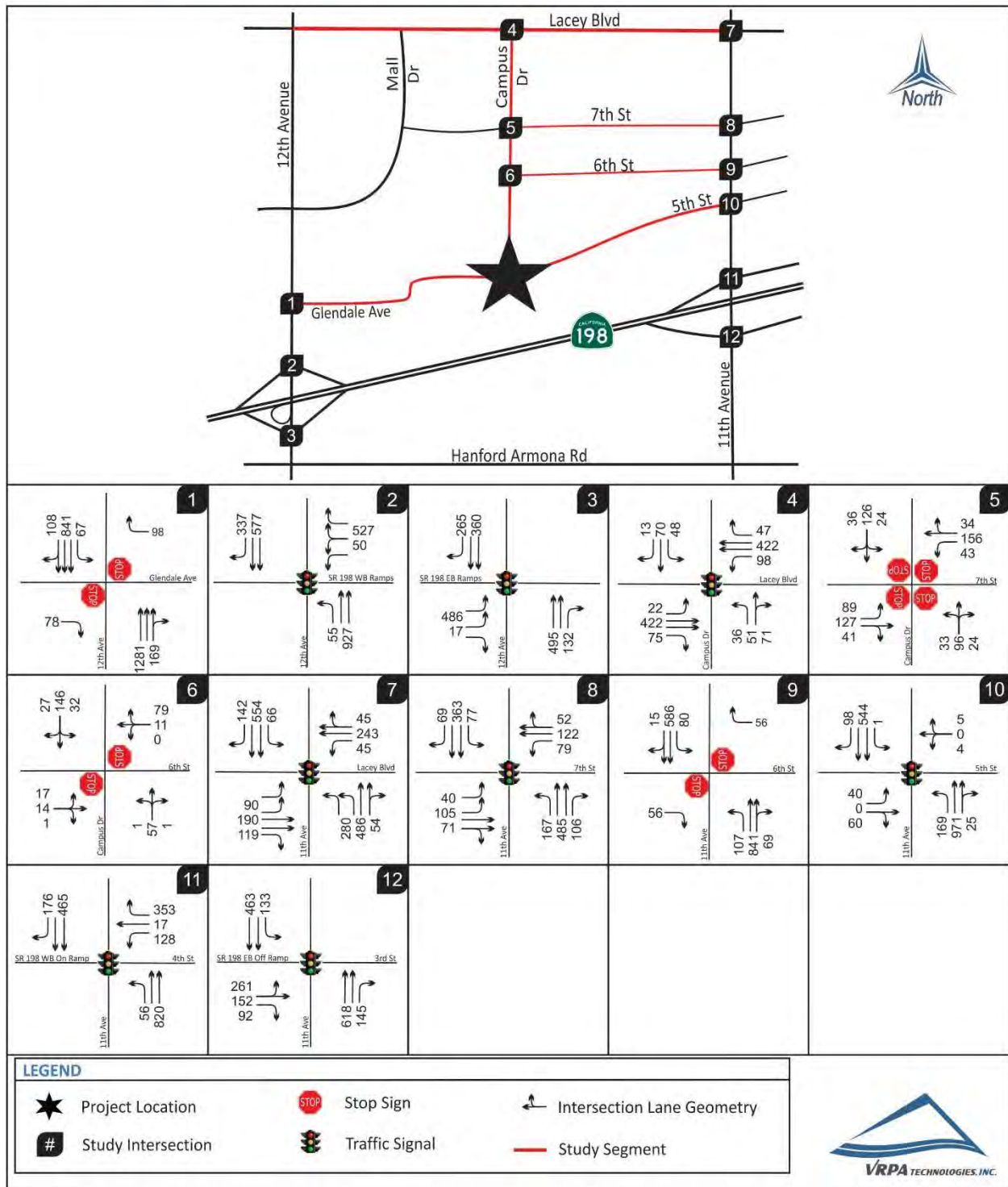
**Hanford Place Development**  
**Existing Plus Project PM Peak Hour Traffic**

**Figure**  
**3-5**



**Hanford Place Development**  
**Near-Term Plus Project AM Peak Hour Traffic**

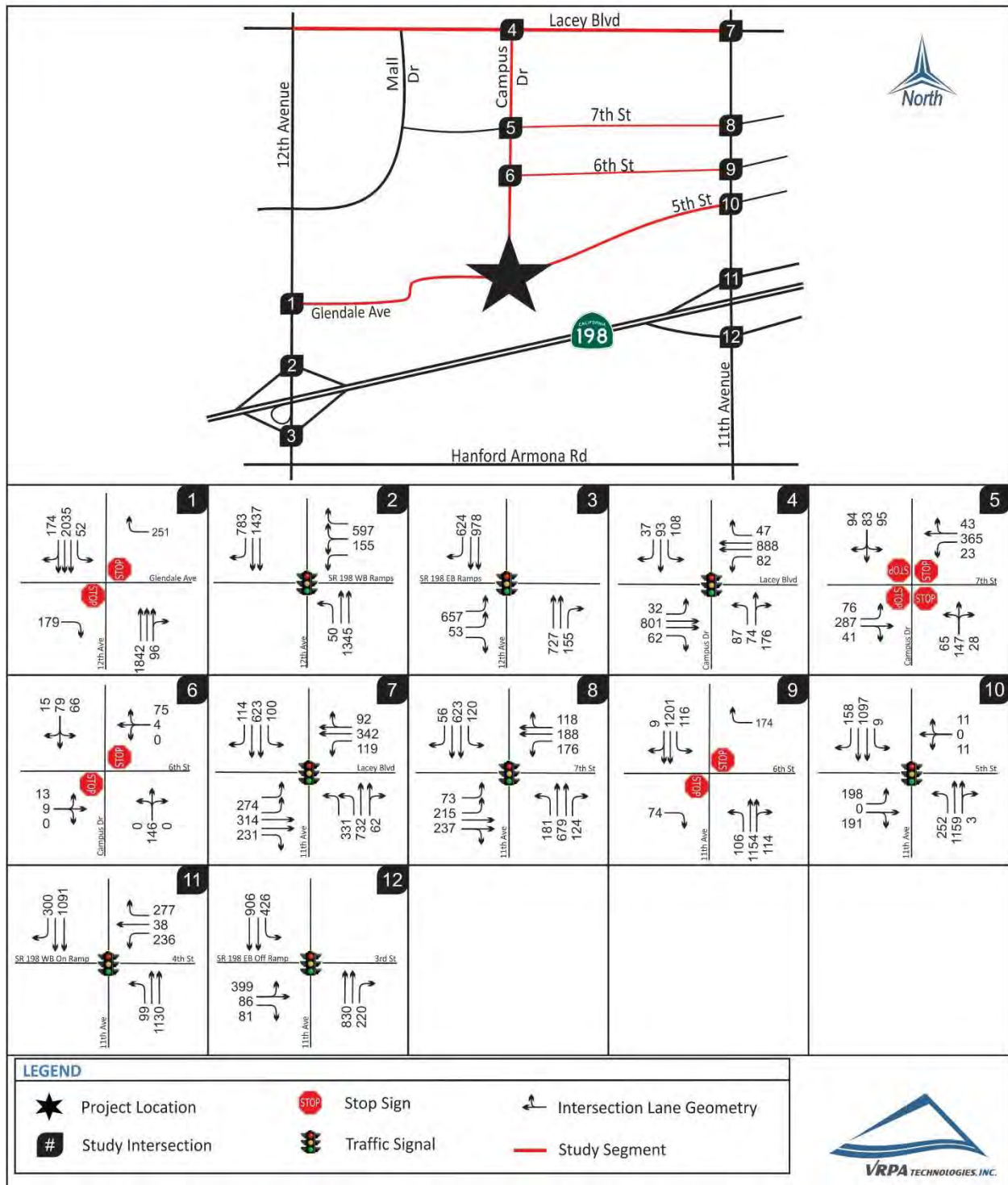
**Figure**  
**3-6**





**Hanford Place Development**  
**Near-Term Plus Project PM Peak Hour Traffic**

**Figure**  
**3-7**



### 3.6 Cumulative Year 2042 Without Project Traffic Conditions

The impacts of the Project were analyzed considering future traffic conditions in the year 2042. The levels of traffic expected in 2042 relate to the cumulative effect of traffic increases resulting from the implementation of the General Plans of local agencies, including the City of Hanford and Kings County. Traffic conditions without the Project in the Year 2042 were estimated by applying a growth rate of 2% per year to the existing traffic volumes. A comparison of the KCAG base year and future year travel model showed that the growth in the study area is approximately 2% per year. The resulting traffic is shown in Figures 3-8 and 3-9.

### 3.7 Cumulative Year 2042 Plus Project Traffic Conditions

The addition of Project trips, as shown in Figures 3-2 and 3-3 (Section 3.3), were added to Cumulative Year 2042 Without Project traffic volumes. This leads to the results shown in Figures 3-10 and 3-11.

### 3.8 Impacts

#### 3.8.1 Intersection Capacity Analysis

Table 3-2 provides the intersection level of service analysis for the study intersections considering the study scenarios discussed above. Potential mitigation measures are discussed in Chapter 4 of this report. Results of the analysis show that the Project will contribute to an unacceptable LOS at five (5) of the study intersections when comparing the Cumulative Year 2042 scenarios.

#### 3.8.2 Queuing Analysis

Table 3-3 provides a queue length summary for left and right turn lanes at study intersections. The queuing analyses is based upon methodology presented in Chapter 400 of Caltrans' Highway Design Manual (HDM). The queue results shown in Table 3-3 represent the approximate queue lengths for the respective lane movements. Results of the queuing analysis show that several movements exceed the existing queue lane storage lengths.

#### 3.8.3 Roadway Segment Capacity Analysis

Table 3-4 shows roadway segments that are expected to fall short of desirable operating conditions for various scenarios. Potential mitigation measures are discussed in Chapter 4 of this report. Results of the analysis also show that the Project will result in a cumulative impact at two (2) of the study roadway segments when comparing the Cumulative Year 2042 scenarios.



### 3.9 VMT Analysis

Since the City of Hanford has not adopted methodologies or thresholds for VMT analyses related to SB 743, the VMT analysis was conducted using statewide guidance provided by the Governor's Office of Planning and Research (OPR) in their Technical Advisory on Evaluating Transportation Impacts in CEQA (OPR, December 2018). OPR recommends comparing project VMT/capita and VMT/employee to regional averages to determine the level of significance of project impacts. VMT/capita and VMT/employee values for the project as well as regional averaged were obtained from an online VMT analysis tool provided by the Kings County Association of Governments (KCAG).

For mixed-use projects (such as the proposed Project), OPR recommends analyzing the individual components of the project separately with respect to VMT analysis and taking a reduction for trips that are made within the project site that would have very low VMT values. Since VMT for internal trips is difficult to quantify, no reductions were taken leading to a somewhat conservative approach. OPR also allows for conducting the analysis of mixed-use projects based on the dominant land use if applicable. In the case of the proposed Project, none of the project components (residential, employment, or retail) is considered to be dominant.

The VMT analysis conducted for the residential, employment, and retail components of the project is described below:

- ✓ Residential: The project is located within two traffic analysis zones (TAZ's) of the Kings County Association of Governments (KCAG) model that have little or no existing residential development and therefore no data on which to form a VMT analysis based on these TAZ's. Instead, the VMT analysis was conducted based on the average VMT/capita of the five TAZ's adjacent to the project site. The resulting daily VMT/capita value is 6.562. For residential projects OPR recommends use of a threshold for VMT/capita 15% below either the regional or city average. Anything below either of these values would result in a less than significant impact. The regional average was used since the city average is not currently available from KCAG. Since the regional average daily VMT/capita is 9.562, the project VMT/capita of 6.56 is 31.7% below the regional average. Since this is more than 15% below the regional average, the residential component of the project has a less than significant transportation impact and no mitigation measures are needed.
- ✓ Employment: The project is located within two traffic analysis zones (TAZ's) of the Kings County Association of Governments (KCAG) model, each with a separate VMT/employee value. The project VMT/employee was calculated based on the average VMT/employee value for the two TAZ's. It should be noted that a larger portion of the project area falls within the TAZ that has a higher VMT/employee level of the two zones and the analysis is therefore somewhat conservative. The resulting daily VMT/capita value is 12.565. For employment projects OPR recommends use of a threshold for VMT/capita 15% below the

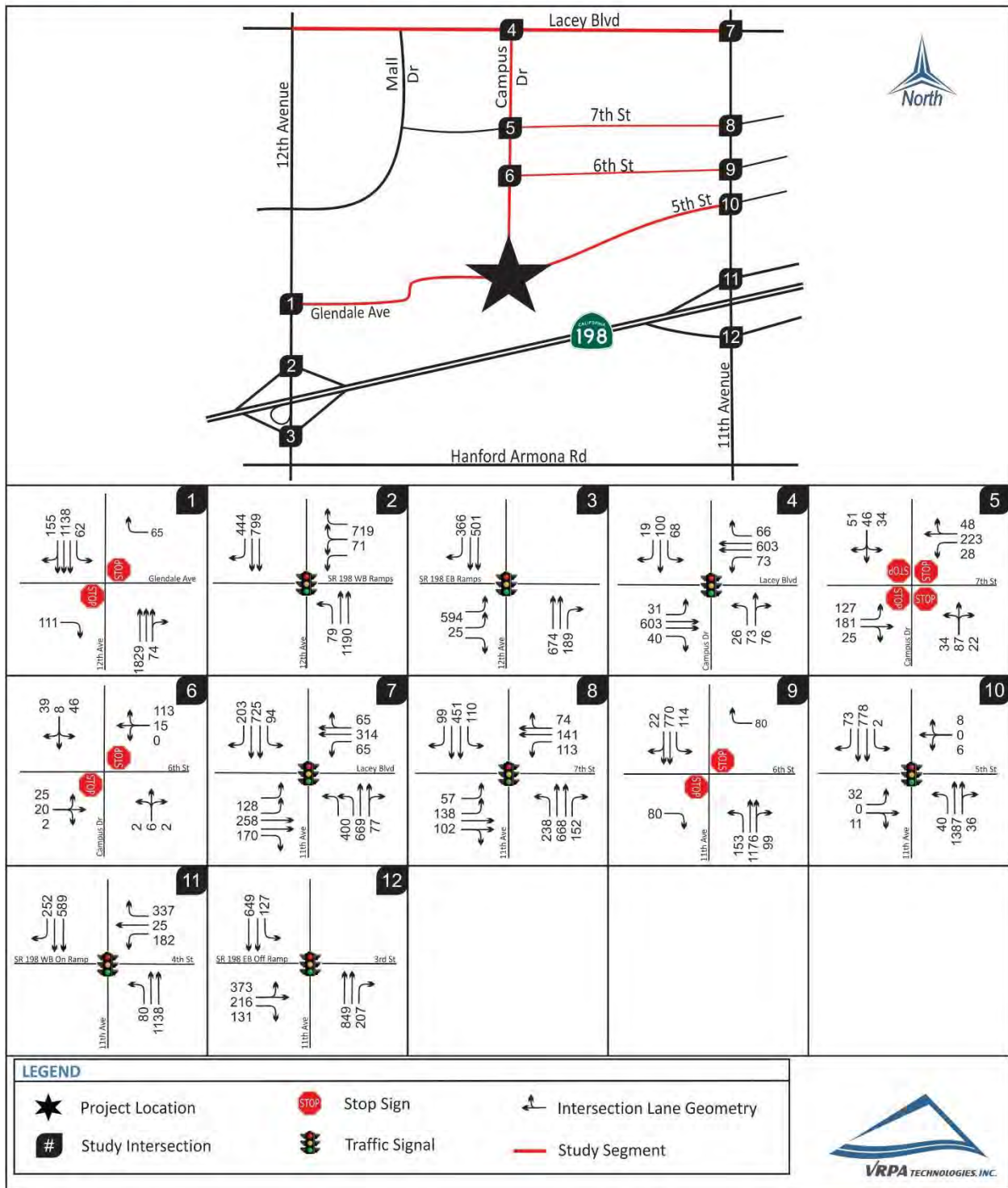
regional average. Anything below this value would result in a less than significant impact. The regional average was used since the city average is not currently available from KCAG. Since the regional average daily VMT/employee is 17.7, the project VMT/capita of 12.565 is 29.0% below the regional average. Since this is more than 15% below the regional average, the employment component of the project has a less than significant transportation impact and no mitigation measures are needed.

- ✓ Retail: For local-serving retail projects, such as the retail component of the proposed Project, OPR recommends that the transportation impact of the project be presumed to be less than significant. This is because local-serving retail developments will generally draw trips from the nearby area and will replace trips currently made to more distant retail locations. Therefore, the retail component of the project has a less than significant transportation impact and no mitigation measures are needed.

Copies of the VMT analysis maps used to conduct this analysis are included in Appendix F.

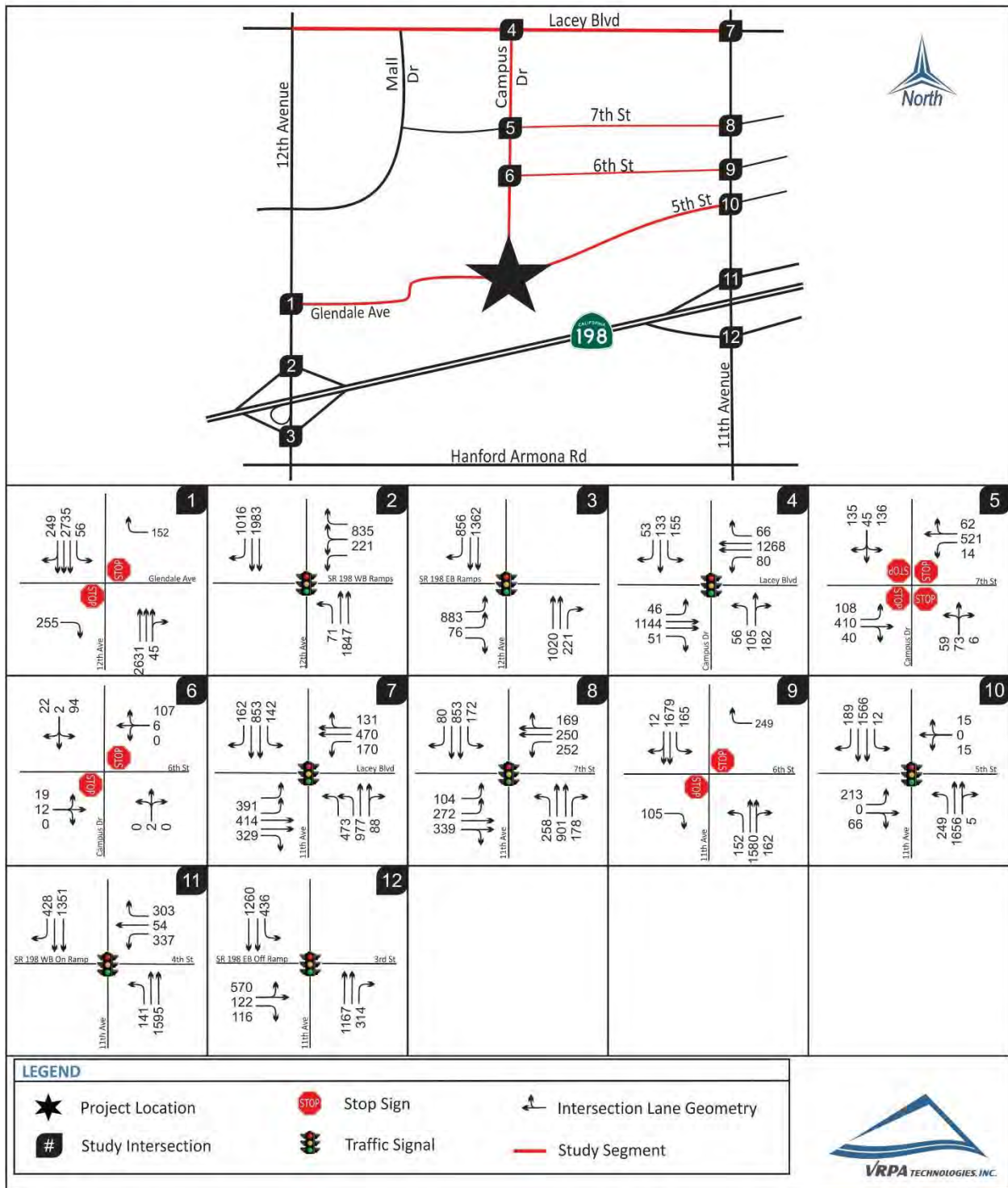
**Hanford Place Development**  
**Cumulative Year 2042 Without Project AM Peak Hour Traffic**

**Figure**  
**3-8**



**Hanford Place Development**  
**Cumulative Year 2042 Without Project PM Peak Hour Traffic**

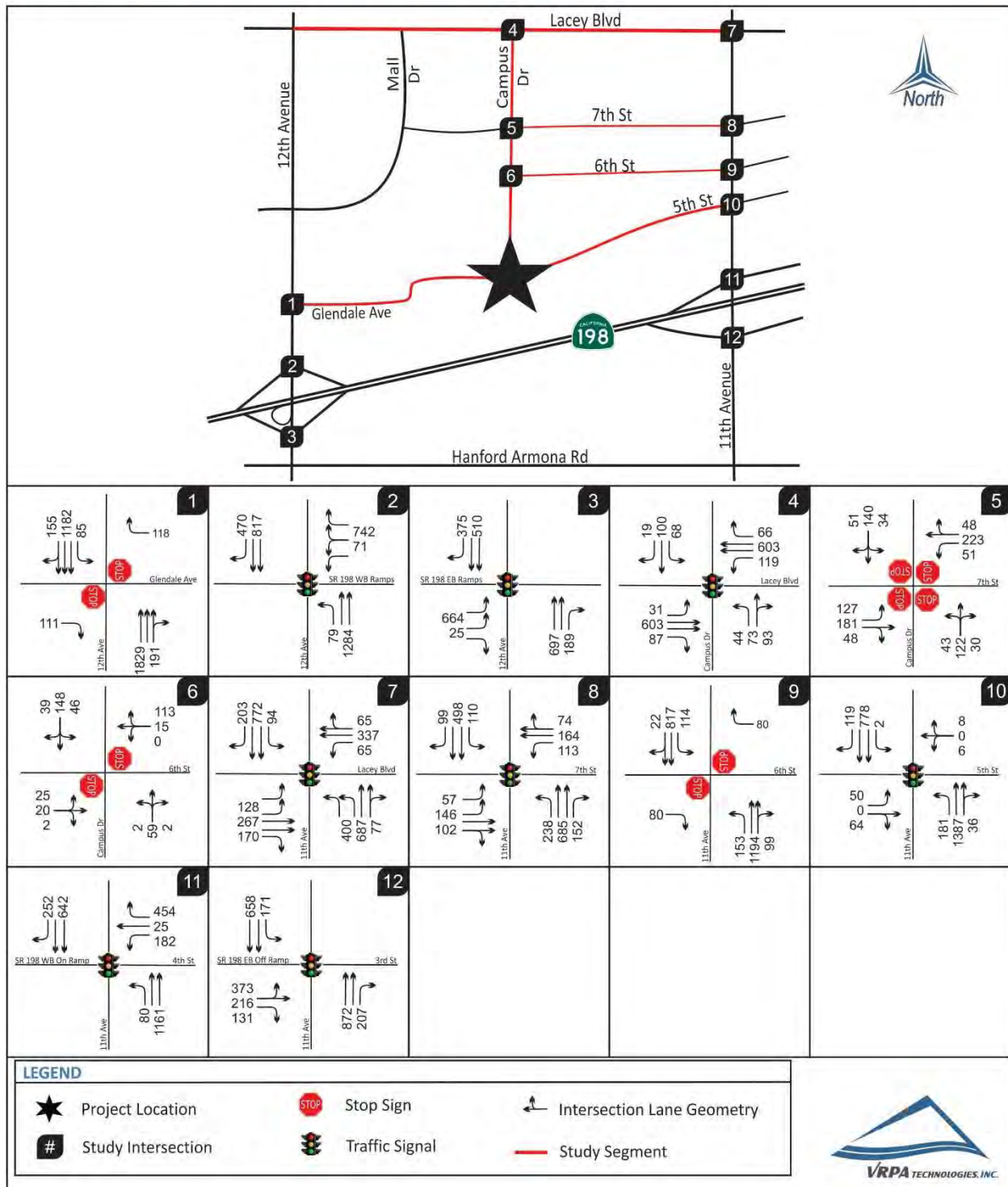
**Figure**  
**3-9**





**Hanford Place Development**  
**Cumulative Year 2042 Plus Project AM Peak Hour Traffic**

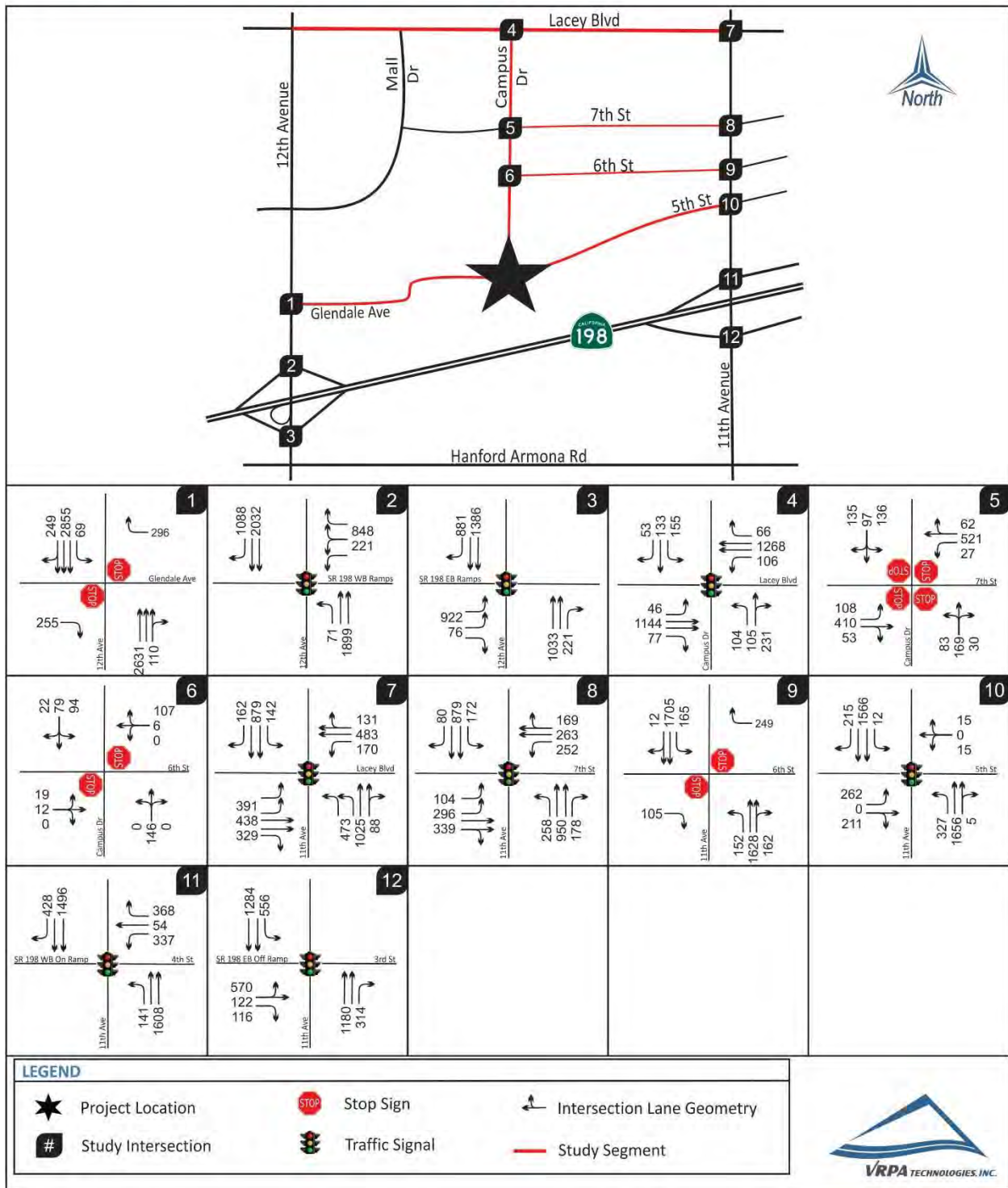
**Figure**  
**3-10**





**Hanford Place Development**  
**Cumulative Year 2042 Plus Project PM Peak Hour Traffic**

**Figure**  
**3-11**



**Table 3-2**  
**Intersection Operations**

| INTERSECTION                                    | CONTROL           | TARGET LOS      | PEAK HOUR | EXISTING PLUS PROJECT |            | NEAR-TERM PLUS PROJECT |            | CUMULATIVE YEAR 2042 WITHOUT PROJECT |          | CUMULATIVE YEAR 2042 PLUS PROJECT |            |
|-------------------------------------------------|-------------------|-----------------|-----------|-----------------------|------------|------------------------|------------|--------------------------------------|----------|-----------------------------------|------------|
|                                                 |                   |                 |           | DELAY                 | LOS        | DELAY                  | LOS        | DELAY                                | LOS      | DELAY                             | LOS        |
| 1. 12th Avenue / Glendale Avenue                | Two-Way Stop Sign | D               | AM        | 30.2                  | D          | <b>37.2</b>            | <b>E</b>   | <b>74.4</b>                          | <b>F</b> | <b>154.4</b>                      | <b>F +</b> |
|                                                 |                   |                 | PM        | <b>184.6</b>          | <b>F +</b> | <b>269.9</b>           | <b>F +</b> | <b>++</b>                            | <b>F</b> | <b>++</b>                         | <b>F +</b> |
| 2. 12th Avenue / SR 198 WB Ramps                | Signalized        | -- <sup>1</sup> | AM        | 13.7                  | B          | 14.5                   | B          | 18.8                                 | B        | 19.9                              | B          |
|                                                 |                   |                 | PM        | 19.4                  | B          | 23.0                   | C          | 64.5                                 | E        | 75.1                              | E          |
| 3. 12th Avenue / SR 198 EB Ramps                | Signalized        | -- <sup>1</sup> | AM        | 12.5                  | B          | 12.7                   | B          | 13.2                                 | B        | 13.7                              | B          |
|                                                 |                   |                 | PM        | 13.6                  | B          | 14.3                   | B          | 19.0                                 | B        | 20.1                              | C          |
| 4. Campus Drive / Lacey Boulevard               | Signalized        | D               | AM        | 25.2                  | C          | 25.4                   | C          | 25.7                                 | C        | 25.5                              | C          |
|                                                 |                   |                 | PM        | 29.2                  | C          | 31.4                   | C          | 52.2                                 | D        | 52.9                              | D          |
| 5. Campus Drive / 7th Street                    | All-Way Stop Sign | D               | AM        | 11.9                  | B          | 12.6                   | B          | 12.1                                 | B        | 15.0                              | B          |
|                                                 |                   |                 | PM        | 23.7                  | C          | 31.8                   | D          | <b>92.9</b>                          | <b>F</b> | <b>146.9</b>                      | <b>F</b>   |
| 6. Campus Drive / 6th Street                    | Two-Way Stop Sign | D               | AM        | 13.3                  | B          | 13.6                   | B          | 10.7                                 | B        | 13.1                              | B          |
|                                                 |                   |                 | PM        | 13.9                  | B          | 14.3                   | B          | 11.5                                 | B        | 14.7                              | B          |
| 7. 11th Avenue / Lacey Boulevard                | Signalized        | D               | AM        | 20.3                  | C          | 21.0                   | C          | 25.3                                 | C        | 25.9                              | C          |
|                                                 |                   |                 | PM        | 28.5                  | C          | 31.6                   | C          | 49.9                                 | D        | 52.7                              | D          |
| 8. 11th Avenue / 7th Street                     | Signalized        | D               | AM        | 18.9                  | B          | 19.7                   | B          | 24.2                                 | C        | 24.4                              | C          |
|                                                 |                   |                 | PM        | 29.0                  | C          | 31.8                   | C          | <b>55.6</b>                          | <b>E</b> | <b>57.6</b>                       | <b>E</b>   |
| 9. 11th Avenue / 6th Street                     | Two-Way Stop Sign | D               | AM        | 12.7                  | B          | 13.3                   | B          | 17.1                                 | C        | 17.3                              | C          |
|                                                 |                   |                 | PM        | 18.1                  | C          | 20.6                   | C          | <b>74.3</b>                          | <b>F</b> | <b>83.6</b>                       | <b>F</b>   |
| 10. 11th Avenue / 5th Street                    | Signalized        | D               | AM        | 9.6                   | A          | 9.7                    | A          | 6.5                                  | A        | 10.7                              | B          |
|                                                 |                   |                 | PM        | 18.1                  | B          | 19.5                   | B          | 23.8                                 | C        | 42.3                              | D          |
| 11. 11th Avenue / 4th Street-SR 198 WB On Ramp  | Signalized        | -- <sup>1</sup> | AM        | 15.3                  | B          | 15.9                   | B          | 16.4                                 | B        | 20.8                              | C          |
|                                                 |                   |                 | PM        | 14.6                  | B          | 15.6                   | B          | 21.0                                 | C        | 28.4                              | C          |
| 12. 11th Avenue / 3rd Street-SR 198 EB Off Ramp | Signalized        | -- <sup>1</sup> | AM        | 21.0                  | C          | 22.9                   | C          | 27.0                                 | C        | 30.2                              | C          |
|                                                 |                   |                 | PM        | 30.6                  | C          | 35.4                   | D          | 76.3                                 | E        | 97.4                              | F          |

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized and all-way stop intersections, delay results show the average for the entire intersection. For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

1 - With the changes brought about by SB 743, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020 and the Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance will be used in determining the need for roadway improvements on Caltrans facilities.

+ Meets peak hour signal warrants.

++ Delay Exceeds 300 seconds.

**Table 3-3**  
**Queuing Operations**

| INTERSECTION                                | EXISTING QUEUE STORAGE LENGTH (ft) |         | EXISTING PLUS PROJECT |            | NEAR-TERM PLUS PROJECT |            | CUMULATIVE YEAR 2042 WITHOUT PROJECT |            | CUMULATIVE YEAR 2042 PLUS PROJECT |            |
|---------------------------------------------|------------------------------------|---------|-----------------------|------------|------------------------|------------|--------------------------------------|------------|-----------------------------------|------------|
|                                             |                                    |         | AM Queue              | PM Queue   | AM Queue               | PM Queue   | AM Queue                             | PM Queue   | AM Queue                          | PM Queue   |
| 12th Avenue / Glendale Avenue               | SB Left                            | 125     | 53                    | 41         | 56                     | 43         | 52                                   | 47         | 71                                | 58         |
| 12th Avenue / SR 198 WB Ramps               | NB Left                            | 400     | 43                    | 38         | 46                     | 42         | 66                                   | 59         | 66                                | 59         |
|                                             | WB Approach                        | 3 @ 275 | 445                   | 580        | 481                    | 627        | 658                                  | <b>880</b> | 678                               | <b>891</b> |
| 12th Avenue / SR 198 EB Ramps               | SB Right                           | 600     | 205                   | 482        | 221                    | 520        | 305                                  | <b>713</b> | 313                               | <b>734</b> |
|                                             | EB Left                            | 2 @ 875 | 378                   | 508        | 405                    | 548        | 495                                  | 736        | 553                               | 768        |
|                                             | EB Right                           | 850     | 13                    | 41         | 14                     | 44         | 21                                   | 63         | 21                                | 63         |
| Campus Drive / Lacey Boulevard              | NB Left                            | 75      | 29                    | 70         | 30                     | 73         | 22                                   | 47         | 37                                | <b>87</b>  |
|                                             | SB Left                            | 200     | 37                    | 83         | 40                     | 90         | 57                                   | 129        | 57                                | 129        |
|                                             | SB Right                           | 100     | 10                    | 28         | 11                     | 31         | 16                                   | 44         | 16                                | 44         |
|                                             | EB Left                            | 200     | 17                    | 25         | 18                     | 27         | 26                                   | 38         | 26                                | 38         |
|                                             | EB Right                           | 100     | 61                    | 49         | 63                     | 52         | 33                                   | 43         | 73                                | 64         |
|                                             | WB Left                            | 125     | 78                    | 65         | 82                     | 68         | 61                                   | 67         | 99                                | 88         |
|                                             | WB Right                           | 100     | 36                    | 36         | 39                     | 39         | 55                                   | 55         | 55                                | 55         |
| Campus Drive / 7th Street                   | EB Left                            | 100     | 68                    | 58         | 74                     | 63         | <b>106</b>                           | 90         | <b>106</b>                        | 90         |
|                                             | WB Left                            | 100     | 34                    | 18         | 36                     | 19         | 23                                   | 12         | 43                                | 23         |
| 11th Avenue / Lacey Boulevard               | NB Left                            | 2 @ 200 | 216                   | 255        | 233                    | 276        | 333                                  | 394        | 333                               | 394        |
|                                             | SB Left                            | 150     | 51                    | 77         | 55                     | 83         | 78                                   | 118        | 78                                | 118        |
|                                             | SB Right                           | 150     | 109                   | 88         | 118                    | 95         | <b>169</b>                           | 135        | <b>169</b>                        | 135        |
|                                             | EB Left                            | 2 @ 125 | 69                    | 211        | 75                     | 228        | 107                                  | <b>326</b> | 107                               | <b>326</b> |
|                                             | EB Right                           | 100     | 92                    | <b>178</b> | 99                     | <b>193</b> | <b>142</b>                           | <b>274</b> | <b>142</b>                        | <b>274</b> |
|                                             | WB Left                            | 100     | 35                    | 92         | 38                     | 99         | 54                                   | <b>142</b> | 54                                | <b>142</b> |
| 11th Avenue / 7th Street                    | NB Left                            | 125     | <b>128</b>            | <b>139</b> | <b>139</b>             | <b>151</b> | <b>198</b>                           | <b>215</b> | <b>198</b>                        | <b>215</b> |
|                                             | NB Right                           | 100     | 82                    | 96         | 88                     | <b>103</b> | <b>127</b>                           | <b>148</b> | <b>127</b>                        | <b>148</b> |
|                                             | SB Left                            | 100     | 59                    | 93         | 64                     | <b>100</b> | <b>92</b>                            | <b>143</b> | <b>92</b>                         | <b>143</b> |
|                                             | SB Right                           | 100     | 53                    | 43         | 58                     | 47         | 83                                   | 67         | 83                                | 67         |
|                                             | EB Left                            | 2 @ 75  | 31                    | 56         | 33                     | 61         | 48                                   | 87         | 48                                | 87         |
|                                             | WB Left                            | 125     | 61                    | <b>136</b> | 66                     | <b>147</b> | 94                                   | <b>210</b> | 94                                | <b>210</b> |
| 11th Avenue / 6th Street                    | NB Left                            | 75      | <b>83</b>             | <b>82</b>  | <b>89</b>              | <b>88</b>  | <b>128</b>                           | <b>127</b> | <b>128</b>                        | <b>127</b> |
|                                             | SB Left                            | 125     | 62                    | 89         | 67                     | 97         | 95                                   | <b>138</b> | 95                                | <b>138</b> |
| 11th Avenue / 5th Street                    | NB Left                            | 150     | 138                   | <b>199</b> | 141                    | <b>210</b> | 33                                   | <b>208</b> | 151                               | <b>273</b> |
|                                             | SB Left                            | 50      | 1                     | 7          | 1                      | 8          | 2                                    | 10         | 2                                 | 10         |
|                                             | SB Right                           | 50      | <b>78</b>             | <b>123</b> | <b>82</b>              | <b>132</b> | <b>61</b>                            | <b>158</b> | <b>99</b>                         | <b>179</b> |
|                                             | EB Left                            | 50      | 33                    | <b>155</b> | 33                     | <b>165</b> | 27                                   | <b>178</b> | 42                                | <b>218</b> |
| 11th Avenue / 4th Street-SR 198 WB On Ramp  | NB Left                            | 75      | 43                    | 76         | 47                     | <b>83</b>  | 67                                   | <b>118</b> | 67                                | <b>118</b> |
|                                             | SB Right                           | 75      | <b>136</b>            | <b>231</b> | <b>147</b>             | <b>250</b> | <b>210</b>                           | <b>357</b> | <b>210</b>                        | <b>357</b> |
|                                             | WB Left                            | 125     | 98                    | <b>182</b> | 107                    | <b>197</b> | <b>152</b>                           | <b>281</b> | <b>152</b>                        | <b>281</b> |
| 11th Avenue / 3rd Street-SR 198 EB Off Ramp | NB Right                           | 75      | <b>112</b>            | <b>169</b> | <b>121</b>             | <b>183</b> | <b>173</b>                           | <b>262</b> | <b>173</b>                        | <b>262</b> |
|                                             | SB Left                            | 150     | 105                   | <b>336</b> | 111                    | <b>355</b> | 106                                  | <b>363</b> | 143                               | <b>463</b> |
|                                             | EB Right                           | 25      | <b>71</b>             | <b>63</b>  | <b>77</b>              | <b>68</b>  | <b>109</b>                           | <b>97</b>  | <b>109</b>                        | <b>97</b>  |

Queue is measured in feet / **BOLD** denotes exceedance

**Table 3-4**  
**Segment Operations**

| STREET SEGMENT                      | SEGMENT DESCRIPTION | TARGET LOS | PEAK HOUR | EXISTING PLUS PROJECT |     | NEAR-TERM PLUS PROJECT |     | CUMULATIVE YEAR 2042 WITHOUT PROJECT |     | CUMULATIVE YEAR 2042 PLUS PROJECT |     |
|-------------------------------------|---------------------|------------|-----------|-----------------------|-----|------------------------|-----|--------------------------------------|-----|-----------------------------------|-----|
|                                     |                     |            |           | VOLUME                | LOS | VOLUME                 | LOS | VOLUME                               | LOS | VOLUME                            | LOS |
| Lacey Boulevard                     |                     |            |           |                       |     |                        |     |                                      |     |                                   |     |
| 12th Avenue to Campus Drive         | 4 Lanes Divided     | D          | AM        | 919                   | C   | 990                    | C   | 1,322                                | C   | 1,386                             | C   |
|                                     |                     |            | PM        | 1,767                 | C   | 1,907                  | C   | 2,617                                | D   | 2,691                             | D   |
| Campus Drive to 11th Avenue         | 4 Lanes Divided     | D          | AM        | 1,027                 | C   | 1,107                  | C   | 1,489                                | C   | 1,553                             | C   |
|                                     |                     |            | PM        | 1,947                 | C   | 2,101                  | C   | 2,896                                | D   | 2,970                             | E   |
| 7th Street                          |                     |            |           |                       |     |                        |     |                                      |     |                                   |     |
| Campus Drive to 11th Avenue         | 2 Lanes Undivided   | D          | AM        | 378                   | D   | 407                    | D   | 535                                  | D   | 567                               | D   |
|                                     |                     |            | PM        | 780                   | D   | 841                    | D   | 1,149                                | E   | 1,186                             | E   |
| 6th Street                          |                     |            |           |                       |     |                        |     |                                      |     |                                   |     |
| Campus Drive to 11th Avenue         | 2 Lanes Undivided   | D          | AM        | 127                   | C   | 137                    | C   | 196                                  | C   | 196                               | C   |
|                                     |                     |            | PM        | 142                   | C   | 154                    | C   | 220                                  | C   | 220                               | C   |
| Glendale Avenue                     |                     |            |           |                       |     |                        |     |                                      |     |                                   |     |
| East of 12th Avenue                 | 2 Lanes Undivided   | D          | AM        | 323                   | C   | 334                    | D   | 201                                  | C   | 394                               | D   |
|                                     |                     |            | PM        | 385                   | D   | 399                    | D   | 252                                  | C   | 474                               | D   |
| 5th Avenue                          |                     |            |           |                       |     |                        |     |                                      |     |                                   |     |
| West of 11th Avenue                 | 2 Lanes Undivided   | D          | AM        | 359                   | D   | 367                    | D   | 156                                  | C   | 414                               | D   |
|                                     |                     |            | PM        | 760                   | D   | 799                    | D   | 717                                  | D   | 1,014                             | D   |
| Campus Drive                        |                     |            |           |                       |     |                        |     |                                      |     |                                   |     |
| Lacey Bouleovard to Glendale Avenue | 2 Lanes Undivided   | D          | AM        | 380                   | D   | 400                    | D   | 388                                  | D   | 517                               | D   |
|                                     |                     |            | PM        | 541                   | D   | 574                    | D   | 608                                  | D   | 756                               | D   |

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

## 4.0 Mitigation

As discussed in Section 3.0 Impacts, the potentially significant impacts resulting from the Project relate to the generation of unacceptable LOS at various intersections and road segments in the long term. Considering the criteria provided in Section 1.3 and the results presented in Section 3.0, the following improvements are recommended to alleviate project-specific impacts.

### 4.1 Recommended Improvements

#### 4.1.1 Intersections

- ✓ 12<sup>th</sup> Avenue at Glendale Avenue  
*No Recommended improvements.*

Installation of a traffic signal would alleviate level of service deficiencies at the intersection for all study scenarios. However, providing a traffic signal at this location is not practical given the close spacing of adjacent intersections. In lieu of the traffic signal, dual right turn lanes for the eastbound and westbound approaches to the intersection should be considered to alleviate queuing at the eastbound and westbound approaches.

- ✓ Campus Drive at 7<sup>th</sup> Street  
*Recommended improvements to achieve acceptable levels of service:*
  - Cumulative Year 2042 Plus Project scenario:
    - Install Traffic Signal

The improvements identified above for the Cumulative Year 2042 Plus Project scenario are sufficient to meet the City of Hanford's acceptable LOS standard of 'D'.

- ✓ 11<sup>th</sup> Avenue at 7<sup>th</sup> Street  
*No Recommended improvements.*

Providing additional turning movement lanes along 11<sup>th</sup> Avenue and 7<sup>th</sup> Street is not possible due to design constraints or infeasible/impractical due to the presence of commercial development that currently exists along the north and south side of 7<sup>th</sup> Street.

- ✓ 11<sup>th</sup> Avenue at 6<sup>th</sup> Street  
*No Recommended improvements.*

This intersection is forecasted to operate at unacceptable LOS 'F' (PM) under Cumulative Year 2042 Without Project and Cumulative Year 2042 Plus Project conditions; however, this intersection does not meet the peak hour traffic signal warrant because the minor approaches do not carry enough traffic to justify signalization. Therefore, no improvements



are recommended for the Project's contribution of traffic at the intersection for the Cumulative Year 2042 Plus Project condition.

- ✓ 12<sup>th</sup> Avenue at SR 198 WB Ramps  
*No Recommended improvements.*

Providing additional turning movement lanes at the 12<sup>th</sup> Avenue and SR 198 WB Ramps intersection is not possible due to design constraints or infeasible/impractical due to the presence of development that currently exists along the north side of the SR 198 WB Ramps. As noted in Section 1.3, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes.

- ✓ 11<sup>th</sup> Avenue at 3<sup>rd</sup> Street-SR 198 EB Off Ramp  
*No Recommended improvements.*

Providing additional turning movement lanes at the 11<sup>th</sup> Avenue and 3<sup>rd</sup> Street-SR 198 EB Off Ramp intersection is not possible due to design constraints or infeasible/impractical due to the presence of development that currently exists along the south side of 3<sup>rd</sup> Street and the SR 198 EB Off Ramp. As noted in Section 1.3, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes.

#### 4.1.2 Roadway Segments

- ✓ Lacey Boulevard between Campus Drive and 11<sup>th</sup> Avenue  
*No Recommended improvements.*

Providing additional travel lanes along Lacey Boulevard is not possible due to design constraints or infeasible/impractical due to the presence of retail development that currently exists along the north and south side of Lacey Boulevard. In addition, accommodating additional travel lanes along Lacey Boulevard could result in the elimination of parking along Lacey Boulevard.

- ✓ 7<sup>th</sup> Street between Campus Drive and 11<sup>th</sup> Avenue  
*Recommended improvements:*

- Cumulative Year 2042 Plus Project scenario:
  - Restripe to provide two-way left turn lane with removal of parking as necessary

Providing additional travel lanes along 7<sup>th</sup> Street is not possible due to right-of-way constraints.

## Post-Mitigation Level of Significance

The level of service resulting from the potential improvements identified above is shown in Tables 4-1 and 4-2. Table 4-3 identifies left turn and right turn lane pocket lengths required for the Cumulative Year 2042 scenario. Although the need for extended turn lane pockets would occur at some locations prior to the Cumulative Year 2042 scenario, this scenario provides the maximum length needed and therefore these lengths would also provide for projected traffic volumes under the Existing Plus Project and Near-Term Plus Project scenarios. The left turn and right turn pocket length do not include deceleration lengths.

**Table 4-1**  
**Intersection Operations with Mitigation**

| INTERSECTION                                    | CONTROL           | TARGET LOS      | PEAK HOUR | EXISTING PLUS PROJECT |                      | NEAR-TERM PLUS PROJECT |                      | CUMULATIVE YEAR 2042 PLUS PROJECT |                      |
|-------------------------------------------------|-------------------|-----------------|-----------|-----------------------|----------------------|------------------------|----------------------|-----------------------------------|----------------------|
|                                                 |                   |                 |           | DELAY                 | LOS                  | DELAY                  | LOS                  | DELAY                             | LOS                  |
| 1. 12th Avenue / Glendale Avenue                | Two-Way Stop Sign | D               | AM        | 30.2                  | D                    | <b>37.2</b>            | <b>E<sup>2</sup></b> | <b>154.4</b>                      | <b>F<sup>2</sup></b> |
|                                                 |                   |                 | PM        | <b>184.6</b>          | <b>F<sup>2</sup></b> | <b>269.9</b>           | <b>F<sup>2</sup></b> | <b>++</b>                         | <b>F<sup>2</sup></b> |
| 2. 12th Avenue / SR 198 WB Ramps                | Signalized        | -- <sup>1</sup> | AM        |                       |                      |                        |                      | 19.9                              | B                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | 75.1                              | E <sup>3</sup>       |
| 5. Campus Drive / 7th Street                    | Signalized        | D               | AM        |                       |                      |                        |                      | 12.8                              | B                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | 20.4                              | C                    |
| 8. 11th Avenue / 7th Street                     | Signalized        | D               | AM        |                       |                      |                        |                      | 24.4                              | C                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | <b>57.6</b>                       | <b>E<sup>3</sup></b> |
| 9. 11th Avenue / 6th Street                     | Two-Way Stop Sign | D               | AM        |                       |                      |                        |                      | 17.3                              | C                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | <b>83.6</b>                       | <b>F<sup>4</sup></b> |
| 12. 11th Avenue / 3rd Street-SR 198 EB Off Ramp | Signalized        | -- <sup>1</sup> | AM        |                       |                      |                        |                      | 30.2                              | C                    |
|                                                 |                   |                 | PM        |                       |                      |                        |                      | 97.4                              | F <sup>3</sup>       |

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized and all-way stop intersections, delay results show the average for the entire intersection. For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

1 - With the changes brought about by SB 743, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020 and the Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance will be used in determining the need for roadway improvements on Caltrans facilities.

2 Installation of a traffic signal would alleviate LOS deficiencies at the intersection. A traffic signal is not recommended given the close spacing of adjacent intersections.

3 Improvements to the intersection aren't recommended given the presence of abutting commercial development at the intersection.

4 Intersection does not meet the peak hour traffic signal warrant.

++ Delay Exceeds 300 seconds.

**Table 4-2**  
**Segment Operations with Mitigation**

| STREET SEGMENT              | TARGET LOS | PEAK HOUR | CUMULATIVE<br>YEAR 2042<br>PLUS PROJECT |     |
|-----------------------------|------------|-----------|-----------------------------------------|-----|
|                             |            |           | VOLUME                                  | LOS |
| Lacey Boulevard             |            |           |                                         |     |
| Campus Drive to 11th Avenue | D          | AM        | 1,553                                   | C   |
|                             |            | PM        | 2,970                                   | E * |
| 7th Street                  |            |           |                                         |     |
| Campus Drive to 11th Avenue | D          | AM        | 567                                     | D   |
|                             |            | PM        | 1,186                                   | E * |

\* Capacity Increasing Improvements to the roadway segment aren't recommended given the presence of abutting commercial development.

**Table 4-3**  
**Left Turn and Right Turn Storage Requirements**

| INTERSECTION                                | EXISTING QUEUE STORAGE LENGTH (ft) |         | CUMULATIVE YEAR 2042 PLUS PROJECT RECOMMENDED STORAGE LENGTH (ft) |
|---------------------------------------------|------------------------------------|---------|-------------------------------------------------------------------|
|                                             |                                    |         |                                                                   |
| 12th Avenue / Glendale Avenue               | SB Left                            | 125     | 125                                                               |
| 12th Avenue / SR 198 WB Ramps               | NB Left                            | 400     | 400                                                               |
|                                             | WB Approach                        | 3 @ 275 | <b>3 @ 300</b>                                                    |
| 12th Avenue / SR 198 EB Ramps               | SB Right                           | 600     | 600                                                               |
|                                             | EB Left                            | 2 @ 875 | 2 @ 875                                                           |
|                                             | EB Right                           | 850     | 850                                                               |
| Campus Drive / Lacey Boulevard              | NB Left                            | 75      | 100                                                               |
|                                             | SB Left                            | 200     | 200                                                               |
|                                             | SB Right                           | 100     | 100                                                               |
|                                             | EB Left                            | 200     | 200                                                               |
|                                             | EB Right                           | 100     | 100                                                               |
|                                             | WB Left                            | 125     | 125                                                               |
|                                             | WB Right                           | 100     | 100                                                               |
| Campus Drive / 7th Street                   | EB Left                            | 100     | 100                                                               |
|                                             | WB Left                            | 100     | 100                                                               |
| 11th Avenue / Lacey Boulevard               | NB Left                            | 2 @ 200 | 2 @ 200                                                           |
|                                             | SB Left                            | 150     | 150                                                               |
|                                             | SB Right                           | 150     | <b>175</b>                                                        |
|                                             | EB Left                            | 2 @ 125 | 2 @ 125                                                           |
|                                             | EB Right                           | 100     | 100                                                               |
|                                             | WB Left                            | 100     | 100                                                               |
| 11th Avenue / 7th Street                    | NB Left                            | 125     | 125                                                               |
|                                             | NB Right                           | 100     | 100                                                               |
|                                             | SB Left                            | 100     | 100                                                               |
|                                             | SB Right                           | 100     | 100                                                               |
|                                             | EB Left                            | 2 @ 75  | 2 @ 75                                                            |
|                                             | WB Left                            | 125     | 125                                                               |
| 11th Avenue / 6th Street                    | NB Left                            | 75      | 75                                                                |
|                                             | SB Left                            | 125     | 125                                                               |
| 11th Avenue / 5th Street                    | NB Left                            | 150     | <b>250</b>                                                        |
|                                             | SB Left                            | 50      | 50                                                                |
|                                             | SB Right                           | 50      | 50                                                                |
|                                             | EB Left                            | 50      | <b>225</b>                                                        |
| 11th Avenue / 4th Street-SR 198 WB On Ramp  | NB Left                            | 75      | 75                                                                |
|                                             | SB Right                           | 75      | 75                                                                |
|                                             | WB Left                            | 125     | 125                                                               |
| 11th Avenue / 3rd Street-SR 198 EB Off Ramp | NB Right                           | 75      | 75                                                                |
|                                             | SB Left                            | 150     | 150                                                               |
|                                             | EB Left                            | --      | <b>2 @ 250</b>                                                    |
|                                             | EB Right                           | 25      | 25                                                                |

**BOLD** denotes change in storage length

## 4.2 Equitable Share Responsibility

This section documents the Project's fair-share responsibility towards the costs of improvements that are identified for the Cumulative Year 2042 scenario. The intent of determining the equitable responsibility for the improvements identified above for the Cumulative Year 2042 scenario, is to provide information for the applicant and the City of Hanford to address traffic mitigation equitability and to calculate the equitable share for mitigating traffic impacts. The formulas used to calculate the equitable share responsibility to City of Hanford facilities is as follows:

$$\text{Equitable Share} = (\text{Project Trips}) / (\text{Future Year Plus Project Traffic})$$

Table 4-4 shows the Project's equitable fair share responsibility on a percentage basis for improvements to City of Hanford facilities as described above. The equitable fair share responsibility shown in Table 4-4 is the result of LOS enhancements related to capacity.

**Table 4-4**  
**Cumulative Year 2042 Equitable Share Responsibility**

| INTERSECTION                                    | PEAK HOUR | PROJECT TRIPS | CUMULATIVE YEAR 2042 PLUS PROJECT | FAIR SHARE PERCENTAGE |
|-------------------------------------------------|-----------|---------------|-----------------------------------|-----------------------|
| Campus Drive / 7th Street                       | AM        | 193           | 1,098                             | 17.6%                 |
|                                                 | PM        | 223           | 1,830                             | 12.2%                 |
| ROADWAY SEGMENT                                 |           |               |                                   |                       |
| 7th Street between Campus Drive and 11th Avenue | AM        | 32            | 567                               | 5.6%                  |
|                                                 | PM        | 37            | 1,186                             | 3.1%                  |

Based on a review of the information provided in this section and the remainder of the traffic impact study, the City of Hanford and the applicant have determined that the payment of the City's impact fees will satisfy the Project's obligations to pay for an equitable share of the improvements.



# **APPENDIX A**

## Modified Arterial Level of Service Tables

**Generalized Peak Hour Two-Way Volumes for Florida's  
Urbanized Areas<sup>1</sup>**

**TABLE 4**

03/14/2018

03/14/2016

| INTERRUPTED FLOW FACILITIES                                                                                                           |           |                      |                       |                    |       | UNINTERRUPTED FLOW FACILITIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                      |                    |        |        |  |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|-----------------------|--------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|--------------------|--------|--------|--|
| STATE SIGNALIZED ARTERIALS                                                                                                            |           |                      |                       |                    |       | FREEWAYS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                      |                    |        |        |  |
| Principal (1 signal per half mile)                                                                                                    |           |                      |                       |                    |       | Lanes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B         | C                    | D                  | E      |        |  |
| Lanes                                                                                                                                 | Median    | B                    | C                     | D                  | E     | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4,560     | 6,200                | 7,690              | 7,870  |        |  |
| 2                                                                                                                                     | Undivided | *                    | 360                   | 1,250              | 1,690 | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 6,650     | 9,150                | 11,350             | 11,820 |        |  |
| 4                                                                                                                                     | Divided   | 90                   | 2,450                 | 3,250              | 3,400 | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 8,760     | 12,130               | 15,110             | 15,760 |        |  |
| 6                                                                                                                                     | Divided   | 150                  | 3,710                 | 4,890              | 5,130 | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 11,960    | 16,800               | 19,710             | **     |        |  |
|                                                                                                                                       |           |                      |                       |                    |       | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 14,820    | 19,980               | 23,640             | **     |        |  |
| Minor (1 signal per quarter mile)                                                                                                     |           |                      |                       |                    |       | Freeway Adjustments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                      |                    |        |        |  |
| Lanes                                                                                                                                 | Median    | B                    | C                     | D                  | E     | Auxiliary Lanes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      | Ramp               |        |        |  |
| 2                                                                                                                                     | Undivided | *                    | *                     | 380                | 1,290 | Present in Both Directions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                      | Metering           |        |        |  |
| 4                                                                                                                                     | Divided   | *                    | 850                   | 2,530              | 3,350 | + 1,800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |                      | + 5%               |        |        |  |
| 6                                                                                                                                     | Divided   | *                    | 1,600                 | 3,980              | 5,050 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| Non-State Signalized Roadway Adjustments                                                                                              |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| (Alter corresponding state volumes by the indicated percent.)                                                                         |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| Non-State Signalized Roadways - 10%                                                                                                   |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| Median & Turn Lane Adjustments                                                                                                        |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| Lanes                                                                                                                                 | Median    | Exclusive Left Lanes | Exclusive Right Lanes | Adjustment Factors |       | Lanes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Median    | B                    | C                  | D      | E      |  |
| 2                                                                                                                                     | Divided   | Yes                  | No                    | +5%                |       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Undivided | 1,110                | 1,690              | 2,290  | 3,070  |  |
| 2                                                                                                                                     | Undivided | No                   | No                    | -20%               |       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Divided   | 3,350                | 4,840              | 6,090  | 6,840  |  |
| Multi                                                                                                                                 | Undivided | Yes                  | No                    | -5%                |       | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Divided   | 5,040                | 7,250              | 9,130  | 10,250 |  |
| Multi                                                                                                                                 | Undivided | No                   | No                    | -25%               |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| —                                                                                                                                     | —         | —                    | Yes                   | + 5%               |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| One-Way Facility Adjustment                                                                                                           |           |                      |                       |                    |       | UNINTERRUPTED FLOW HIGHWAYS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                      |                    |        |        |  |
| Multiply the corresponding two-directional volumes in this table by 0.6                                                               |           |                      |                       |                    |       | Lanes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Median    | B                    | C                  | D      | E      |  |
|                                                                                                                                       |           |                      |                       |                    |       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Undivided | 1,110                | 1,690              | 2,290  | 3,070  |  |
|                                                                                                                                       |           |                      |                       |                    |       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Divided   | 3,350                | 4,840              | 6,090  | 6,840  |  |
|                                                                                                                                       |           |                      |                       |                    |       | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Divided   | 5,040                | 7,250              | 9,130  | 10,250 |  |
| One-Way Facility Adjustment                                                                                                           |           |                      |                       |                    |       | Uninterrupted Flow Highway Adjustments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                      |                    |        |        |  |
| Multiply the corresponding two-directional volumes in this table by 0.6                                                               |           |                      |                       |                    |       | Lanes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Median    | Exclusive left lanes | Adjustment factors |        |        |  |
|                                                                                                                                       |           |                      |                       |                    |       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Divided   | Yes                  | +5%                |        |        |  |
|                                                                                                                                       |           |                      |                       |                    |       | Multi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Undivided | Yes                  | -5%                |        |        |  |
|                                                                                                                                       |           |                      |                       |                    |       | Multi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Undivided | No                   | -25%               |        |        |  |
| BICYCLE MODE <sup>2</sup>                                                                                                             |           |                      |                       |                    |       | <sup>1</sup> Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual. |           |                      |                    |        |        |  |
| (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.) |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| <b>Paved Shoulder/Bicycle</b>                                                                                                         |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| Lane Coverage                                                                                                                         | B         | C                    | D                     | E                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 0-49%                                                                                                                                 | *         | 260                  | 680                   | 1,770              |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 50-84%                                                                                                                                | 190       | 600                  | 1,770                 | >1,770             |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 85-100%                                                                                                                               | 830       | 1,770                | >1,770                | **                 |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| PEDESTRIAN MODE <sup>2</sup>                                                                                                          |           |                      |                       |                    |       | <sup>2</sup> Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                      |                    |        |        |  |
| (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.) |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| <b>Sidewalk Coverage</b>                                                                                                              |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| B                                                                                                                                     | C         | D                    | E                     |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 0-49%                                                                                                                                 | *         | *                    | 260                   | 850                |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 50-84%                                                                                                                                | *         | 150                  | 780                   | 1,420              |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 85-100%                                                                                                                               | 340       | 960                  | 1,560                 | >1,770             |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| BUS MODE (Scheduled Fixed Route) <sup>3</sup>                                                                                         |           |                      |                       |                    |       | <sup>3</sup> Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                      |                    |        |        |  |
| (Buses in peak hour in peak direction)                                                                                                |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| <b>Sidewalk Coverage</b>                                                                                                              |           |                      |                       |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| B                                                                                                                                     | C         | D                    | E                     |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 0-84%                                                                                                                                 | > 5       | ≥ 4                  | ≥ 3                   | ≥ 2                |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
| 85-100%                                                                                                                               | > 4       | ≥ 3                  | ≥ 2                   | ≥ 1                |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                      |                    |        |        |  |
|                                                                                                                                       |           |                      |                       |                    |       | <b>Source:</b><br>Florida Department of Transportation<br>Systems Planning Office<br><a href="http://www.dot.state.fl.us/planning/systems/sm/los/default.shtm">www.dot.state.fl.us/planning/systems/sm/los/default.shtm</a>                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                      |                    |        |        |  |

**TABLE 4**  
(continued)

**Generalized Peak Hour Two-Way Volumes for Florida's Urbanized Areas**

03/14/2018

| INPUT VALUE ASSUMPTIONS                | Uninterrupted Flow Facilities |          |                  | Interrupted Flow Facilities |       |                 |        |           |            |
|----------------------------------------|-------------------------------|----------|------------------|-----------------------------|-------|-----------------|--------|-----------|------------|
|                                        | Freeways                      | Highways |                  | Principal Arterials         |       | Minor Arterials |        | Bicycle   | Pedestrian |
| ROADWAY CHARACTERISTICS                |                               |          |                  |                             |       |                 |        |           |            |
| Area type (urban, rural)               | urban                         |          |                  |                             |       |                 |        |           |            |
| Number of through lanes (both dir.)    | 4-12                          | 2        | 4-6              | 2-4                         | 6     | 2-4             | 6      | 4         | 4          |
| Posted speed (mph)                     | 70                            | 50       | 50               | 50                          | 50    | 40              | 40     | 45        | 45         |
| Free flow speed (mph)                  | 75                            | 55       | 55               | 55                          | 55    | 45              | 45     | 50        | 50         |
| Auxiliary Lanes (n, y)                 | n                             |          |                  |                             |       |                 |        |           |            |
| Median (d, u, twlt)                    |                               |          | d                |                             |       |                 |        |           |            |
| Terrain (l,r)                          | l                             | l        | l                | l                           | l     | l               | l      | l         | l          |
| % no passing zone                      |                               | 80       |                  |                             |       |                 |        |           |            |
| Exclusive left turn lane impact (n, y) |                               | [n]      | y                | y                           | y     | y               | y      | y         | y          |
| Exclusive right turn lanes (n, y)      |                               |          |                  | n                           | y     | n               | y      |           |            |
| Facility length (mi)                   | 3                             | 5        | 5                | 2                           | 2     | 2               | 2      | 2         | 2          |
| Interchange Density (intch/mi)         | 1                             |          |                  |                             |       |                 |        |           |            |
| TRAFFIC CHARACTERISTICS                |                               |          |                  |                             |       |                 |        |           |            |
| Planning analysis hour factor (K)      | 0.090                         | 0.090    | 0.090            | 0.090                       | 0.090 | 0.090           | 0.090  | 0.090     | 0.090      |
| Directional distribution factor (D)    | 0.55                          | 0.55     | 0.55             | 0.55                        | 0.55  | 0.55            | 0.55   | 0.565     | 0.565      |
| Peak hour factor (PHF)                 | 1.00                          | 1.00     | 1.00             | 1.00                        | 1.00  | 1.00            | 1.00   | 1.00      | 1.00       |
| Base saturation flow rate (pcphpl)     | 2,400                         | 1,700    | 2,100            | 1,950                       | 1,950 | 1,950           | 1,950  | 1,950     | 1,950      |
| Heavy vehicle percent                  | 4.0                           | 2.0      | 2.0              | 2.0                         | 2.0   | 2.0             | 2.0    | 2.5       | 2.0        |
| Speed Adjustment Factor (SAF)          | 0.950                         |          | 0.950            |                             |       |                 |        |           |            |
| Capacity Adjustment Factor (CAF)       | 0.939                         |          | 0.939            |                             |       |                 |        |           |            |
| % left turns                           |                               |          |                  | 12                          | 12    | 12              | 12     | 12        | 12         |
| % right turns                          |                               |          |                  | 12                          | 12    | 12              | 12     | 12        | 12         |
| CONTROL CHARACTERISTICS                |                               |          |                  |                             |       |                 |        |           |            |
| Number of signals                      |                               |          |                  | 5                           | 5     | 9               | 9      | 4         | 6          |
| Arrival type (1-6)                     |                               |          |                  | 3                           | 3     | 3               | 3      | 4         | 4          |
| Signal type (a, c, p)                  |                               |          |                  | c                           | c     | c               | c      | c         | c          |
| Cycle length (C)                       |                               |          |                  | 150                         | 150   | 120             | 120    | 120       | 120        |
| Effective green ratio (g/C)            |                               |          |                  | 0.44                        | 0.44  | 0.44            | 0.44   | 0.44      | 0.44       |
| MULTIMODAL CHARACTERISTICS             |                               |          |                  |                             |       |                 |        |           |            |
| Paved shoulder/bicycle lane (n, y)     |                               |          |                  |                             |       |                 |        | n, 50%, y | n          |
| Outside lane width                     |                               |          |                  |                             |       |                 |        | t         | t          |
| Pavement condition                     |                               |          |                  |                             |       |                 |        | t         |            |
| On-street parking                      |                               |          |                  |                             |       |                 |        | n         | n          |
| Sidewalk (n, y)                        |                               |          |                  |                             |       |                 |        |           | n, 50%, y  |
| Sidewalk/roadway separation (a, t, w)  |                               |          |                  |                             |       |                 |        |           | t          |
| Sidewalk protective barrier (n, y)     |                               |          |                  |                             |       |                 |        |           | n          |
| LEVEL OF SERVICE THRESHOLDS            |                               |          |                  |                             |       |                 |        |           |            |
| Level of Service                       | Freeways                      | Highways |                  | Arterials                   |       | Bicycle         | Ped    | Bus       |            |
|                                        | Density pc/mi/ln              | Two-Lane | Multilane        | Principal & Minor           |       | Score           | Score  | Buses/hr. |            |
|                                        |                               | %ffs     | Density pc/mi/ln | %bffs                       |       |                 |        |           |            |
| B                                      | ≤ 18                          | > 83.3   | ≤ 18             | > 67                        |       | ≤ 2.75          | ≤ 2.75 | ≤ 6       |            |
| C                                      | ≤ 26                          | > 75.0   | ≤ 26             | > 50                        |       | ≤ 3.50          | ≤ 3.50 | ≤ 4       |            |
| D                                      | ≤ 35                          | > 66.7   | ≤ 35             | > 40                        |       | ≤ 4.25          | ≤ 4.25 | < 3       |            |
| E                                      | ≤ 45                          | ≤ 66.7   | ≤ 45             | > 30                        |       | ≤ 5.00          | ≤ 5.00 | < 2       |            |

pc/mi/ln = passenger cars per mile per lane

%ffs = percent free flow speed

%bffs = percent base free flow speed

# **APPENDIX B**

## Traffic Count Data Worksheets

**VOLUME**

N 11th Ave Bet. W 6th St &amp; W 7th St

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_008

| DAILY TOTALS |       |       |     |     | NB     | SB        | EB    |       |     |     |       | WB   | Total |
|--------------|-------|-------|-----|-----|--------|-----------|-------|-------|-----|-----|-------|------|-------|
|              |       |       |     |     | 11,082 | 11,303    |       |       |     |     |       | 0    | 0     |
| AM Period    | NB    | SB    | EB  | WB  | TOTAL  | PM Period | NB    | SB    | EB  | WB  | TOTAL |      |       |
| 0:00         | 31    | 25    |     |     | 56     | 12:00     | 217   | 224   |     |     | 441   |      |       |
| 0:15         | 30    | 21    |     |     | 51     | 12:15     | 222   | 199   |     |     | 421   |      |       |
| 0:30         | 20    | 22    |     |     | 42     | 12:30     | 184   | 222   |     |     | 406   |      |       |
| 0:45         | 12    | 93    | 18  | 86  | 30     | 12:45     | 171   | 794   | 206 | 851 | 377   | 1645 |       |
| 1:00         | 11    | 14    |     |     | 25     | 13:00     | 179   | 172   |     |     | 351   |      |       |
| 1:15         | 13    | 10    |     |     | 23     | 13:15     | 201   | 192   |     |     | 393   |      |       |
| 1:30         | 9     | 8     |     |     | 17     | 13:30     | 195   | 193   |     |     | 388   |      |       |
| 1:45         | 12    | 45    | 14  | 46  | 26     | 13:45     | 238   | 813   | 204 | 761 | 442   | 1574 |       |
| 2:00         | 19    | 5     |     |     | 24     | 14:00     | 176   | 184   |     |     | 360   |      |       |
| 2:15         | 10    | 7     |     |     | 17     | 14:15     | 208   | 184   |     |     | 392   |      |       |
| 2:30         | 9     | 8     |     |     | 17     | 14:30     | 224   | 218   |     |     | 442   |      |       |
| 2:45         | 10    | 48    | 10  | 30  | 20     | 14:45     | 220   | 828   | 198 | 784 | 418   | 1612 |       |
| 3:00         | 15    | 10    |     |     | 25     | 15:00     | 242   | 227   |     |     | 469   |      |       |
| 3:15         | 4     | 10    |     |     | 14     | 15:15     | 222   | 194   |     |     | 416   |      |       |
| 3:30         | 9     | 17    |     |     | 26     | 15:30     | 228   | 236   |     |     | 464   |      |       |
| 3:45         | 12    | 40    | 15  | 52  | 27     | 15:45     | 223   | 915   | 223 | 880 | 446   | 1795 |       |
| 4:00         | 10    | 12    |     |     | 22     | 16:00     | 247   | 243   |     |     | 490   |      |       |
| 4:15         | 19    | 25    |     |     | 44     | 16:15     | 242   | 210   |     |     | 452   |      |       |
| 4:30         | 21    | 27    |     |     | 48     | 16:30     | 239   | 234   |     |     | 473   |      |       |
| 4:45         | 33    | 83    | 36  | 100 | 69     | 16:45     | 215   | 943   | 225 | 912 | 440   | 1855 |       |
| 5:00         | 34    | 38    |     |     | 72     | 17:00     | 223   | 256   |     |     | 479   |      |       |
| 5:15         | 43    | 61    |     |     | 104    | 17:15     | 207   | 229   |     |     | 436   |      |       |
| 5:30         | 33    | 75    |     |     | 108    | 17:30     | 183   | 220   |     |     | 403   |      |       |
| 5:45         | 51    | 161   | 75  | 249 | 126    | 17:45     | 193   | 806   | 175 | 880 | 368   | 1686 |       |
| 6:00         | 45    | 100   |     |     | 145    | 18:00     | 174   | 229   |     |     | 403   |      |       |
| 6:15         | 88    | 92    |     |     | 180    | 18:15     | 182   | 172   |     |     | 354   |      |       |
| 6:30         | 61    | 79    |     |     | 140    | 18:30     | 164   | 183   |     |     | 347   |      |       |
| 6:45         | 73    | 267   | 89  | 360 | 162    | 18:45     | 155   | 675   | 177 | 761 | 332   | 1436 |       |
| 7:00         | 69    | 96    |     |     | 165    | 19:00     | 156   | 172   |     |     | 328   |      |       |
| 7:15         | 103   | 114   |     |     | 217    | 19:15     | 137   | 156   |     |     | 293   |      |       |
| 7:30         | 140   | 117   |     |     | 257    | 19:30     | 131   | 147   |     |     | 278   |      |       |
| 7:45         | 186   | 498   | 117 | 444 | 303    | 19:45     | 115   | 539   | 140 | 615 | 255   | 1154 |       |
| 8:00         | 167   | 108   |     |     | 275    | 20:00     | 95    | 126   |     |     | 221   |      |       |
| 8:15         | 134   | 111   |     |     | 245    | 20:15     | 89    | 107   |     |     | 196   |      |       |
| 8:30         | 143   | 114   |     |     | 257    | 20:30     | 69    | 98    |     |     | 167   |      |       |
| 8:45         | 171   | 615   | 120 | 453 | 291    | 20:45     | 72    | 325   | 75  | 406 | 147   | 731  |       |
| 9:00         | 153   | 139   |     |     | 292    | 21:00     | 59    | 102   |     |     | 161   |      |       |
| 9:15         | 134   | 155   |     |     | 289    | 21:15     | 45    | 82    |     |     | 127   |      |       |
| 9:30         | 166   | 127   |     |     | 293    | 21:30     | 55    | 69    |     |     | 124   |      |       |
| 9:45         | 171   | 624   | 133 | 554 | 304    | 21:45     | 58    | 217   | 63  | 316 | 121   | 533  |       |
| 10:00        | 147   | 164   |     |     | 311    | 22:00     | 44    | 52    |     |     | 96    |      |       |
| 10:15        | 174   | 176   |     |     | 350    | 22:15     | 46    | 45    |     |     | 91    |      |       |
| 10:30        | 165   | 156   |     |     | 321    | 22:30     | 50    | 57    |     |     | 107   |      |       |
| 10:45        | 201   | 687   | 178 | 674 | 379    | 22:45     | 37    | 177   | 40  | 194 | 77    | 371  |       |
| 11:00        | 171   | 187   |     |     | 358    | 23:00     | 43    | 26    |     |     | 69    |      |       |
| 11:15        | 190   | 201   |     |     | 391    | 23:15     | 38    | 24    |     |     | 62    |      |       |
| 11:30        | 169   | 200   |     |     | 369    | 23:30     | 33    | 42    |     |     | 75    |      |       |
| 11:45        | 206   | 736   | 179 | 767 | 385    | 23:45     | 39    | 153   | 36  | 128 | 75    | 281  |       |
| TOTALS       | 3897  | 3815  |     |     | 7712   | TOTALS    | 7185  | 7488  |     |     | 14673 |      |       |
| SPLIT %      | 50.5% | 49.5% |     |     | 34.5%  | SPLIT %   | 49.0% | 51.0% |     |     | 65.5% |      |       |

| DAILY TOTALS    |       |       |       |       | NB     | SB              | EBWB  |       |       |       |       | Total |
|-----------------|-------|-------|-------|-------|--------|-----------------|-------|-------|-------|-------|-------|-------|
|                 |       |       |       |       | 11,082 | 11,303          |       |       |       |       |       | 0     |
| AM Peak Hour    | 11:45 | 11:45 |       |       | 11:45  | PM Peak Hour    | 15:45 | 16:30 |       |       | 15:45 |       |
| AM Pk Volume    | 829   | 824   |       |       | 1653   | PM Pk Volume    | 951   | 944   |       |       | 1861  |       |
| Pk Hr Factor    | 0.934 | 0.920 |       |       | 0.937  | Pk Hr Factor    | 0.963 | 0.922 |       |       | 0.949 |       |
| 7 - 9 Volume    | 1113  | 897   | 0     | 0     | 2010   | 4 - 6 Volume    | 1749  | 1792  | 0     | 0     | 3541  |       |
| 7 - 9 Peak Hour | 7:45  | 7:15  |       |       | 7:30   | 4 - 6 Peak Hour | 16:00 | 16:30 |       |       | 16:00 |       |
| 7 - 9 Pk Volume | 630   | 456   | 0     | 0     | 1080   | 4 - 6 Pk Volume | 943   | 944   | 0     | 0     | 1855  |       |
| Pk Hr Factor    | 0.847 | 0.974 | 0.000 | 0.000 | 0.891  | Pk Hr Factor    | 0.954 | 0.922 | 0.000 | 0.000 | 0.946 |       |



**VOLUME**

W 6th St Bet. Campus Dr &amp; N 11th Ave

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_007

| DAILY TOTALS |    |    |       |       | NB    | SB |           |    |    |       |       | EB    | WB    | Total |     |
|--------------|----|----|-------|-------|-------|----|-----------|----|----|-------|-------|-------|-------|-------|-----|
|              |    |    |       |       | 0     | 0  |           |    |    |       |       | 740   | 1,022 | 1,762 |     |
| AM Period    | NB | SB | EB    | WB    | TOTAL |    | PM Period | NB | SB | EB    | WB    | TOTAL |       |       |     |
| 0:00         |    |    | 0     | 3     | 3     |    | 12:00     |    |    | 19    | 11    | 30    |       |       |     |
| 0:15         |    |    | 2     | 1     | 3     |    | 12:15     |    |    | 17    | 28    | 45    |       |       |     |
| 0:30         |    |    | 0     | 0     | 0     |    | 12:30     |    |    | 22    | 22    | 44    |       |       |     |
| 0:45         |    |    | 2     | 4     | 2     | 6  | 12:45     |    |    | 20    | 78    | 26    | 87    | 46    | 165 |
| 1:00         |    |    | 2     | 0     | 2     |    | 13:00     |    |    | 13    | 24    | 37    |       |       |     |
| 1:15         |    |    | 0     | 0     | 0     |    | 13:15     |    |    | 13    | 19    | 32    |       |       |     |
| 1:30         |    |    | 1     | 0     | 1     |    | 13:30     |    |    | 18    | 23    | 41    |       |       |     |
| 1:45         |    |    | 0     | 3     | 3     | 3  | 13:45     |    |    | 16    | 60    | 20    | 86    | 36    | 146 |
| 2:00         |    |    | 0     | 1     | 1     |    | 14:00     |    |    | 14    | 24    | 38    |       |       |     |
| 2:15         |    |    | 0     | 1     | 1     |    | 14:15     |    |    | 15    | 19    | 34    |       |       |     |
| 2:30         |    |    | 1     | 0     | 1     |    | 14:30     |    |    | 16    | 19    | 35    |       |       |     |
| 2:45         |    |    | 1     | 2     | 3     | 5  | 14:45     |    |    | 10    | 55    | 18    | 80    | 28    | 135 |
| 3:00         |    |    | 1     | 1     | 2     |    | 15:00     |    |    | 19    | 18    | 37    |       |       |     |
| 3:15         |    |    | 1     | 0     | 1     |    | 15:15     |    |    | 12    | 23    | 35    |       |       |     |
| 3:30         |    |    | 0     | 1     | 1     |    | 15:30     |    |    | 13    | 19    | 32    |       |       |     |
| 3:45         |    |    | 1     | 3     | 0     | 2  | 15:45     |    |    | 8     | 52    | 23    | 83    | 31    | 135 |
| 4:00         |    |    | 1     | 4     | 5     |    | 16:00     |    |    | 15    | 11    | 26    |       |       |     |
| 4:15         |    |    | 0     | 2     | 2     |    | 16:15     |    |    | 15    | 18    | 33    |       |       |     |
| 4:30         |    |    | 1     | 1     | 2     |    | 16:30     |    |    | 10    | 15    | 25    |       |       |     |
| 4:45         |    |    | 2     | 4     | 1     | 8  | 16:45     |    |    | 12    | 52    | 22    | 66    | 34    | 118 |
| 5:00         |    |    | 0     | 1     | 1     |    | 17:00     |    |    | 17    | 20    | 37    |       |       |     |
| 5:15         |    |    | 1     | 2     | 3     |    | 17:15     |    |    | 16    | 15    | 31    |       |       |     |
| 5:30         |    |    | 2     | 14    | 16    |    | 17:30     |    |    | 13    | 11    | 24    |       |       |     |
| 5:45         |    |    | 1     | 4     | 9     | 26 | 17:45     |    |    | 3     | 49    | 12    | 58    | 15    | 107 |
| 6:00         |    |    | 3     | 2     | 5     |    | 18:00     |    |    | 7     | 11    | 18    |       |       |     |
| 6:15         |    |    | 4     | 3     | 7     |    | 18:15     |    |    | 7     | 18    | 25    |       |       |     |
| 6:30         |    |    | 9     | 8     | 17    |    | 18:30     |    |    | 13    | 20    | 33    |       |       |     |
| 6:45         |    |    | 9     | 25    | 15    | 28 | 18:45     |    |    | 7     | 34    | 13    | 62    | 20    | 96  |
| 7:00         |    |    | 2     | 5     | 7     |    | 19:00     |    |    | 9     | 10    | 19    |       |       |     |
| 7:15         |    |    | 5     | 10    | 15    |    | 19:15     |    |    | 9     | 6     | 15    |       |       |     |
| 7:30         |    |    | 13    | 12    | 25    |    | 19:30     |    |    | 9     | 9     | 18    |       |       |     |
| 7:45         |    |    | 20    | 40    | 36    | 63 | 19:45     |    |    | 12    | 39    | 10    | 35    | 22    | 74  |
| 8:00         |    |    | 11    | 18    | 29    |    | 20:00     |    |    | 5     | 5     | 10    |       |       |     |
| 8:15         |    |    | 6     | 16    | 22    |    | 20:15     |    |    | 2     | 6     | 8     |       |       |     |
| 8:30         |    |    | 5     | 13    | 18    |    | 20:30     |    |    | 4     | 7     | 11    |       |       |     |
| 8:45         |    |    | 20    | 42    | 17    | 64 | 20:45     |    |    | 6     | 17    | 6     | 24    | 12    | 41  |
| 9:00         |    |    | 9     | 32    | 41    |    | 21:00     |    |    | 8     | 4     | 12    |       |       |     |
| 9:15         |    |    | 11    | 15    | 26    |    | 21:15     |    |    | 5     | 3     | 8     |       |       |     |
| 9:30         |    |    | 9     | 7     | 16    |    | 21:30     |    |    | 2     | 2     | 4     |       |       |     |
| 9:45         |    |    | 8     | 37    | 14    | 68 | 21:45     |    |    | 1     | 16    | 4     | 13    | 5     | 29  |
| 10:00        |    |    | 10    | 20    | 30    |    | 22:00     |    |    | 2     | 2     | 4     |       |       |     |
| 10:15        |    |    | 11    | 16    | 27    |    | 22:15     |    |    | 2     | 3     | 5     |       |       |     |
| 10:30        |    |    | 10    | 9     | 19    |    | 22:30     |    |    | 4     | 3     | 7     |       |       |     |
| 10:45        |    |    | 9     | 40    | 19    | 64 | 22:45     |    |    | 3     | 11    | 5     | 13    | 8     | 24  |
| 11:00        |    |    | 20    | 17    | 37    |    | 23:00     |    |    | 2     | 2     | 4     |       |       |     |
| 11:15        |    |    | 17    | 18    | 35    |    | 23:15     |    |    | 2     | 0     | 2     |       |       |     |
| 11:30        |    |    | 8     | 14    | 22    |    | 23:30     |    |    | 3     | 4     | 7     |       |       |     |
| 11:45        |    |    | 20    | 65    | 19    | 68 | 23:45     |    |    | 1     | 8     | 4     | 10    | 5     | 18  |
| TOTALS       |    |    | 269   | 405   | 674   |    | TOTALS    |    |    | 471   | 617   | 1088  |       |       |     |
| SPLIT %      |    |    | 39.9% | 60.1% | 38.3% |    | SPLIT %   |    |    | 43.3% | 56.7% | 61.7% |       |       |     |

| DAILY TOTALS    |       |       |       |       | NB    | SB |                 |       |       |       |       | EB    | WB    | Total |  |
|-----------------|-------|-------|-------|-------|-------|----|-----------------|-------|-------|-------|-------|-------|-------|-------|--|
|                 |       |       |       |       | 0     | 0  |                 |       |       |       |       | 740   | 1,022 | 1,762 |  |
| AM Peak Hour    |       |       | 11:45 | 7:45  | 11:45 |    | PM Peak Hour    |       |       | 12:00 | 12:15 | 12:15 |       |       |  |
| AM Pk Volume    |       |       | 78    | 83    | 158   |    | PM Pk Volume    |       |       | 78    | 100   | 172   |       |       |  |
| Pk Hr Factor    |       |       | 0.886 | 0.576 | 0.878 |    | Pk Hr Factor    |       |       | 0.886 | 0.893 | 0.935 |       |       |  |
| 7 - 9 Volume    | 0     | 0     | 82    | 127   | 209   |    | 4 - 6 Volume    | 0     | 0     | 101   | 124   | 225   |       |       |  |
| 7 - 9 Peak Hour |       |       | 7:30  | 7:45  | 7:30  |    | 4 - 6 Peak Hour |       |       | 16:45 | 16:15 | 16:15 |       |       |  |
| 7 - 9 Pk Volume | 0     | 0     | 50    | 83    | 132   |    | 4 - 6 Pk Volume | 0     | 0     | 58    | 75    | 129   |       |       |  |
| Pk Hr Factor    | 0.000 | 0.000 | 0.625 | 0.576 | 0.589 |    | Pk Hr Factor    | 0.000 | 0.000 | 0.853 | 0.852 | 0.872 |       |       |  |

**VOLUME**

W 7th St Bet. Campus Dr &amp; N 11th Ave

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_006

| DAILY TOTALS |    |    |       |       | NB    | SB  |           |    |    |       |       | EB    | WB    |  |  |  |  |  | Total |
|--------------|----|----|-------|-------|-------|-----|-----------|----|----|-------|-------|-------|-------|--|--|--|--|--|-------|
|              |    |    |       |       | 0     | 0   |           |    |    |       |       | 3,085 | 3,870 |  |  |  |  |  | 6,955 |
| AM Period    | NB | SB | EB    | WB    | TOTAL |     | PM Period | NB | SB | EB    | WB    | TOTAL |       |  |  |  |  |  | TOTAL |
| 0:00         |    |    | 3     | 2     | 5     |     | 12:00     |    |    | 58    | 102   | 160   |       |  |  |  |  |  |       |
| 0:15         |    |    | 2     | 4     | 6     |     | 12:15     |    |    | 59    | 78    | 137   |       |  |  |  |  |  |       |
| 0:30         |    |    | 1     | 2     | 3     |     | 12:30     |    |    | 56    | 92    | 148   |       |  |  |  |  |  |       |
| 0:45         |    |    | 4     | 10    | 6     | 20  | 12:45     |    |    | 73    | 246   | 335   | 581   |  |  |  |  |  |       |
| 1:00         |    |    | 5     | 3     | 8     |     | 13:00     |    |    | 64    | 92    | 156   |       |  |  |  |  |  |       |
| 1:15         |    |    | 1     | 5     | 6     |     | 13:15     |    |    | 79    | 77    | 156   |       |  |  |  |  |  |       |
| 1:30         |    |    | 2     | 2     | 4     |     | 13:30     |    |    | 61    | 82    | 143   |       |  |  |  |  |  |       |
| 1:45         |    |    | 2     | 10    | 3     | 21  | 13:45     |    |    | 57    | 261   | 325   | 586   |  |  |  |  |  |       |
| 2:00         |    |    | 5     | 5     | 10    |     | 14:00     |    |    | 47    | 88    | 135   |       |  |  |  |  |  |       |
| 2:15         |    |    | 0     | 0     | 0     |     | 14:15     |    |    | 48    | 88    | 136   |       |  |  |  |  |  |       |
| 2:30         |    |    | 4     | 6     | 10    |     | 14:30     |    |    | 78    | 100   | 178   |       |  |  |  |  |  |       |
| 2:45         |    |    | 5     | 14    | 8     | 28  | 14:45     |    |    | 58    | 231   | 365   | 596   |  |  |  |  |  |       |
| 3:00         |    |    | 1     | 2     | 3     |     | 15:00     |    |    | 64    | 85    | 149   |       |  |  |  |  |  |       |
| 3:15         |    |    | 1     | 2     | 3     |     | 15:15     |    |    | 74    | 90    | 164   |       |  |  |  |  |  |       |
| 3:30         |    |    | 4     | 2     | 6     |     | 15:30     |    |    | 65    | 82    | 147   |       |  |  |  |  |  |       |
| 3:45         |    |    | 2     | 8     | 6     | 18  | 15:45     |    |    | 59    | 262   | 343   | 605   |  |  |  |  |  |       |
| 4:00         |    |    | 2     | 5     | 7     |     | 16:00     |    |    | 67    | 81    | 148   |       |  |  |  |  |  |       |
| 4:15         |    |    | 4     | 1     | 5     |     | 16:15     |    |    | 68    | 76    | 144   |       |  |  |  |  |  |       |
| 4:30         |    |    | 3     | 6     | 9     |     | 16:30     |    |    | 71    | 64    | 135   |       |  |  |  |  |  |       |
| 4:45         |    |    | 4     | 13    | 12    | 33  | 16:45     |    |    | 61    | 267   | 300   | 567   |  |  |  |  |  |       |
| 5:00         |    |    | 3     | 7     | 10    |     | 17:00     |    |    | 80    | 76    | 156   |       |  |  |  |  |  |       |
| 5:15         |    |    | 5     | 16    | 21    |     | 17:15     |    |    | 53    | 84    | 137   |       |  |  |  |  |  |       |
| 5:30         |    |    | 13    | 8     | 21    |     | 17:30     |    |    | 60    | 65    | 125   |       |  |  |  |  |  |       |
| 5:45         |    |    | 3     | 24    | 14    | 66  | 17:45     |    |    | 48    | 241   | 283   | 524   |  |  |  |  |  |       |
| 6:00         |    |    | 10    | 10    | 20    |     | 18:00     |    |    | 60    | 49    | 109   |       |  |  |  |  |  |       |
| 6:15         |    |    | 8     | 24    | 32    |     | 18:15     |    |    | 40    | 55    | 95    |       |  |  |  |  |  |       |
| 6:30         |    |    | 9     | 30    | 39    |     | 18:30     |    |    | 49    | 61    | 110   |       |  |  |  |  |  |       |
| 6:45         |    |    | 9     | 36    | 35    | 126 | 18:45     |    |    | 44    | 193   | 225   | 418   |  |  |  |  |  |       |
| 7:00         |    |    | 21    | 21    | 42    |     | 19:00     |    |    | 54    | 51    | 105   |       |  |  |  |  |  |       |
| 7:15         |    |    | 26    | 24    | 50    |     | 19:15     |    |    | 41    | 34    | 75    |       |  |  |  |  |  |       |
| 7:30         |    |    | 23    | 42    | 65    |     | 19:30     |    |    | 41    | 35    | 76    |       |  |  |  |  |  |       |
| 7:45         |    |    | 29    | 99    | 85    | 242 | 19:45     |    |    | 40    | 176   | 216   | 330   |  |  |  |  |  |       |
| 8:00         |    |    | 28    | 30    | 58    |     | 20:00     |    |    | 28    | 40    | 68    |       |  |  |  |  |  |       |
| 8:15         |    |    | 39    | 44    | 83    |     | 20:15     |    |    | 22    | 29    | 51    |       |  |  |  |  |  |       |
| 8:30         |    |    | 37    | 27    | 64    |     | 20:30     |    |    | 19    | 20    | 39    |       |  |  |  |  |  |       |
| 8:45         |    |    | 43    | 147   | 93    | 298 | 20:45     |    |    | 16    | 85    | 101   | 195   |  |  |  |  |  |       |
| 9:00         |    |    | 39    | 57    | 96    |     | 21:00     |    |    | 10    | 16    | 26    |       |  |  |  |  |  |       |
| 9:15         |    |    | 56    | 41    | 97    |     | 21:15     |    |    | 19    | 28    | 47    |       |  |  |  |  |  |       |
| 9:30         |    |    | 45    | 71    | 116   |     | 21:30     |    |    | 15    | 16    | 31    |       |  |  |  |  |  |       |
| 9:45         |    |    | 55    | 195   | 113   | 422 | 21:45     |    |    | 9     | 53    | 62    | 129   |  |  |  |  |  |       |
| 10:00        |    |    | 49    | 73    | 122   |     | 22:00     |    |    | 12    | 6     | 18    |       |  |  |  |  |  |       |
| 10:15        |    |    | 58    | 66    | 124   |     | 22:15     |    |    | 11    | 9     | 20    |       |  |  |  |  |  |       |
| 10:30        |    |    | 50    | 64    | 114   |     | 22:30     |    |    | 12    | 9     | 21    |       |  |  |  |  |  |       |
| 10:45        |    |    | 56    | 213   | 125   | 485 | 22:45     |    |    | 9     | 44    | 53    | 75    |  |  |  |  |  |       |
| 11:00        |    |    | 45    | 73    | 118   |     | 23:00     |    |    | 8     | 8     | 16    |       |  |  |  |  |  |       |
| 11:15        |    |    | 68    | 87    | 155   |     | 23:15     |    |    | 4     | 6     | 10    |       |  |  |  |  |  |       |
| 11:30        |    |    | 54    | 71    | 125   |     | 23:30     |    |    | 8     | 7     | 15    |       |  |  |  |  |  |       |
| 11:45        |    |    | 65    | 232   | 140   | 538 | 23:45     |    |    | 5     | 25    | 30    | 52    |  |  |  |  |  |       |
| TOTALS       |    |    | 1001  | 1296  | 2297  |     | TOTALS    |    |    | 2084  | 2574  | 4658  |       |  |  |  |  |  |       |
| SPLIT %      |    |    | 43.6% | 56.4% | 33.0% |     | SPLIT %   |    |    | 44.7% | 55.3% | 67.0% |       |  |  |  |  |  |       |

| DAILY TOTALS    |       |       |       |       | NB    | SB |                 |       |       |       |       | EB    | WB    |  |  |  |  |  | Total |
|-----------------|-------|-------|-------|-------|-------|----|-----------------|-------|-------|-------|-------|-------|-------|--|--|--|--|--|-------|
|                 |       |       |       |       | 0     | 0  |                 |       |       |       |       | 3,085 | 3,870 |  |  |  |  |  | 6,955 |
| AM Peak Hour    |       |       | 11:15 | 11:45 | 11:45 |    | PM Peak Hour    |       |       | 16:15 | 14:00 | 14:30 |       |  |  |  |  |  |       |
| AM Pk Volume    |       |       | 245   | 347   | 585   |    | PM Pk Volume    |       |       | 280   | 365   | 638   |       |  |  |  |  |  |       |
| Pk Hr Factor    |       |       | 0.901 | 0.850 | 0.914 |    | Pk Hr Factor    |       |       | 0.875 | 0.913 | 0.896 |       |  |  |  |  |  |       |
| 7 - 9 Volume    | 0     | 0     | 246   | 294   | 540   |    | 4 - 6 Volume    | 0     | 0     | 508   | 583   | 1091  |       |  |  |  |  |  |       |
| 7 - 9 Peak Hour |       |       | 8:00  | 7:30  | 8:00  |    | 4 - 6 Peak Hour |       |       | 16:15 | 16:45 | 16:15 |       |  |  |  |  |  |       |
| 7 - 9 Pk Volume | 0     | 0     | 147   | 172   | 298   |    | 4 - 6 Pk Volume | 0     | 0     | 280   | 304   | 575   |       |  |  |  |  |  |       |
| Pk Hr Factor    | 0.000 | 0.000 | 0.855 | 0.768 | 0.801 |    | Pk Hr Factor    | 0.000 | 0.000 | 0.875 | 0.905 | 0.921 |       |  |  |  |  |  |       |

**VOLUME**

Campus Dr Bet. W Lacey Blvd &amp; W 7th St

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_005

| DAILY TOTALS |       |       |    |     | NB    | SB        | EB    |       |    |     |       | WB | Total |
|--------------|-------|-------|----|-----|-------|-----------|-------|-------|----|-----|-------|----|-------|
|              |       |       |    |     | 1,511 | 1,394     |       |       |    |     |       | 0  | 0     |
| AM Period    | NB    | SB    | EB | WB  | TOTAL | PM Period | NB    | SB    | EB | WB  | TOTAL |    |       |
| 0:00         | 2     | 3     |    |     | 5     | 12:00     | 48    | 40    |    |     | 88    |    |       |
| 0:15         | 1     | 2     |    |     | 3     | 12:15     | 30    | 27    |    |     | 57    |    |       |
| 0:30         | 3     | 1     |    |     | 4     | 12:30     | 39    | 46    |    |     | 85    |    |       |
| 0:45         | 1     | 7     | 0  | 6   | 13    | 12:45     | 56    | 173   | 42 | 155 | 328   |    |       |
| 1:00         | 0     | 1     |    |     | 1     | 13:00     | 36    | 42    |    |     | 78    |    |       |
| 1:15         | 0     | 0     |    |     | 0     | 13:15     | 31    | 32    |    |     | 63    |    |       |
| 1:30         | 0     | 0     |    |     | 0     | 13:30     | 28    | 31    |    |     | 59    |    |       |
| 1:45         | 3     | 3     | 0  | 1   | 4     | 13:45     | 38    | 133   | 21 | 126 | 259   |    |       |
| 2:00         | 1     | 0     |    |     | 1     | 14:00     | 30    | 26    |    |     | 56    |    |       |
| 2:15         | 0     | 1     |    |     | 1     | 14:15     | 28    | 17    |    |     | 45    |    |       |
| 2:30         | 2     | 0     |    |     | 2     | 14:30     | 30    | 35    |    |     | 65    |    |       |
| 2:45         | 2     | 5     | 1  | 2   | 7     | 14:45     | 31    | 119   | 25 | 103 | 222   |    |       |
| 3:00         | 1     | 1     |    |     | 2     | 15:00     | 30    | 34    |    |     | 64    |    |       |
| 3:15         | 1     | 0     |    |     | 1     | 15:15     | 25    | 23    |    |     | 48    |    |       |
| 3:30         | 1     | 2     |    |     | 3     | 15:30     | 29    | 28    |    |     | 57    |    |       |
| 3:45         | 0     | 3     | 3  | 6   | 9     | 15:45     | 24    | 108   | 22 | 107 | 215   |    |       |
| 4:00         | 1     | 2     |    |     | 3     | 16:00     | 28    | 26    |    |     | 54    |    |       |
| 4:15         | 3     | 3     |    |     | 6     | 16:15     | 40    | 38    |    |     | 78    |    |       |
| 4:30         | 0     | 2     |    |     | 2     | 16:30     | 33    | 39    |    |     | 72    |    |       |
| 4:45         | 2     | 6     | 3  | 10  | 16    | 16:45     | 27    | 128   | 32 | 135 | 263   |    |       |
| 5:00         | 1     | 3     |    |     | 4     | 17:00     | 45    | 49    |    |     | 94    |    |       |
| 5:15         | 1     | 3     |    |     | 4     | 17:15     | 24    | 25    |    |     | 49    |    |       |
| 5:30         | 3     | 5     |    |     | 8     | 17:30     | 27    | 24    |    |     | 51    |    |       |
| 5:45         | 5     | 10    | 6  | 17  | 27    | 17:45     | 19    | 115   | 14 | 112 | 227   |    |       |
| 6:00         | 3     | 3     |    |     | 6     | 18:00     | 16    | 10    |    |     | 26    |    |       |
| 6:15         | 4     | 11    |    |     | 15    | 18:15     | 11    | 14    |    |     | 25    |    |       |
| 6:30         | 4     | 16    |    |     | 20    | 18:30     | 19    | 19    |    |     | 38    |    |       |
| 6:45         | 6     | 17    | 14 | 44  | 61    | 18:45     | 15    | 61    | 11 | 54  | 115   |    |       |
| 7:00         | 9     | 11    |    |     | 20    | 19:00     | 15    | 13    |    |     | 28    |    |       |
| 7:15         | 22    | 14    |    |     | 36    | 19:15     | 17    | 8     |    |     | 25    |    |       |
| 7:30         | 19    | 13    |    |     | 32    | 19:30     | 13    | 11    |    |     | 24    |    |       |
| 7:45         | 45    | 95    | 19 | 57  | 152   | 19:45     | 13    | 58    | 12 | 44  | 102   |    |       |
| 8:00         | 28    | 22    |    |     | 50    | 20:00     | 11    | 4     |    |     | 15    |    |       |
| 8:15         | 15    | 18    |    |     | 33    | 20:15     | 7     | 6     |    |     | 13    |    |       |
| 8:30         | 20    | 19    |    |     | 39    | 20:30     | 4     | 7     |    |     | 11    |    |       |
| 8:45         | 19    | 82    | 26 | 85  | 167   | 20:45     | 1     | 23    | 7  | 24  | 47    |    |       |
| 9:00         | 26    | 19    |    |     | 45    | 21:00     | 3     | 3     |    |     | 6     |    |       |
| 9:15         | 28    | 20    |    |     | 48    | 21:15     | 4     | 4     |    |     | 8     |    |       |
| 9:30         | 20    | 17    |    |     | 37    | 21:30     | 7     | 0     |    |     | 7     |    |       |
| 9:45         | 22    | 96    | 32 | 88  | 184   | 21:45     | 3     | 17    | 4  | 11  | 28    |    |       |
| 10:00        | 30    | 16    |    |     | 46    | 22:00     | 1     | 3     |    |     | 4     |    |       |
| 10:15        | 26    | 21    |    |     | 47    | 22:15     | 6     | 1     |    |     | 7     |    |       |
| 10:30        | 23    | 16    |    |     | 39    | 22:30     | 2     | 3     |    |     | 5     |    |       |
| 10:45        | 24    | 103   | 26 | 79  | 182   | 22:45     | 2     | 11    | 2  | 9   | 20    |    |       |
| 11:00        | 31    | 22    |    |     | 53    | 23:00     | 1     | 3     |    |     | 4     |    |       |
| 11:15        | 36    | 30    |    |     | 66    | 23:15     | 0     | 1     |    |     | 1     |    |       |
| 11:30        | 28    | 28    |    |     | 56    | 23:30     | 4     | 0     |    |     | 4     |    |       |
| 11:45        | 37    | 132   | 32 | 112 | 244   | 23:45     | 1     | 6     | 3  | 7   | 13    |    |       |
| TOTALS       | 559   | 507   |    |     | 1066  | TOTALS    | 952   | 887   |    |     | 1839  |    |       |
| SPLIT %      | 52.4% | 47.6% |    |     | 36.7% | SPLIT %   | 51.8% | 48.2% |    |     | 63.3% |    |       |

| DAILY TOTALS    |       |       |       |       | NB    | SB              |                 |       |       |       |       | EB | WB    |  |  |  |  |  | Total |
|-----------------|-------|-------|-------|-------|-------|-----------------|-----------------|-------|-------|-------|-------|----|-------|--|--|--|--|--|-------|
|                 |       |       |       |       | 1,511 | 1,394           |                 |       |       |       |       | 0  | 0     |  |  |  |  |  | 2,905 |
| AM Peak Hour    | 11:45 | 11:45 |       |       |       | 11:45           | PM Peak Hour    | 12:00 | 12:30 |       |       |    | 12:00 |  |  |  |  |  |       |
| AM Pk Volume    | 154   | 145   |       |       |       | 299             | PM Pk Volume    | 173   | 162   |       |       |    | 328   |  |  |  |  |  |       |
| Pk Hr Factor    | 0.802 | 0.788 |       |       |       | 0.849           | Pk Hr Factor    | 0.772 | 0.880 |       |       |    | 0.837 |  |  |  |  |  |       |
| 7 - 9 Volume    | 177   | 142   | 0     | 0     | 319   | 4 - 6 Volume    | 243             | 247   | 0     | 0     | 490   |    |       |  |  |  |  |  |       |
| 7 - 9 Peak Hour | 7:15  | 8:00  |       |       |       | 7:45            | 4 - 6 Peak Hour | 16:15 | 16:15 |       |       |    | 16:15 |  |  |  |  |  |       |
| 7 - 9 Pk Volume | 114   | 85    | 0     | 0     | 186   | 4 - 6 Pk Volume | 145             | 158   | 0     | 0     | 303   |    |       |  |  |  |  |  |       |
| Pk Hr Factor    | 0.633 | 0.817 | 0.000 | 0.000 | 0.727 | Pk Hr Factor    | 0.806           | 0.806 | 0.000 | 0.000 | 0.806 |    |       |  |  |  |  |  |       |

**VOLUME**

W Lacey Blvd Bet. Cousins Dr &amp; Campus Dr

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_004

| DAILY TOTALS |    |    |       |       | NB    | SB  |           |    |    |       |       | EB    | WB    |     |      |  |  |  | Total  |
|--------------|----|----|-------|-------|-------|-----|-----------|----|----|-------|-------|-------|-------|-----|------|--|--|--|--------|
|              |    |    |       |       | 0     | 0   |           |    |    |       |       | 7,648 | 7,723 |     |      |  |  |  | 15,371 |
| AM Period    | NB | SB | EB    | WB    | TOTAL |     | PM Period | NB | SB | EB    | WB    | TOTAL |       |     |      |  |  |  | TOTAL  |
| 0:00         |    |    | 11    | 5     | 16    |     | 12:00     |    |    | 155   | 190   | 345   |       |     |      |  |  |  |        |
| 0:15         |    |    | 6     | 8     | 14    |     | 12:15     |    |    | 207   | 187   | 394   |       |     |      |  |  |  |        |
| 0:30         |    |    | 5     | 7     | 12    |     | 12:30     |    |    | 186   | 204   | 390   |       |     |      |  |  |  |        |
| 0:45         |    |    | 4     | 26    | 5     | 25  | 12:45     |    |    | 184   | 732   | 156   | 737   | 340 | 1469 |  |  |  |        |
| 1:00         |    |    | 11    | 7     | 18    |     | 13:00     |    |    | 160   | 163   | 323   |       |     |      |  |  |  |        |
| 1:15         |    |    | 5     | 5     | 10    |     | 13:15     |    |    | 186   | 187   | 373   |       |     |      |  |  |  |        |
| 1:30         |    |    | 4     | 4     | 8     |     | 13:30     |    |    | 159   | 150   | 309   |       |     |      |  |  |  |        |
| 1:45         |    |    | 5     | 25    | 11    | 27  | 13:45     |    |    | 161   | 666   | 168   | 668   | 329 | 1334 |  |  |  |        |
| 2:00         |    |    | 3     | 5     | 8     |     | 14:00     |    |    | 158   | 142   | 300   |       |     |      |  |  |  |        |
| 2:15         |    |    | 5     | 3     | 8     |     | 14:15     |    |    | 142   | 131   | 273   |       |     |      |  |  |  |        |
| 2:30         |    |    | 1     | 1     | 2     |     | 14:30     |    |    | 145   | 158   | 303   |       |     |      |  |  |  |        |
| 2:45         |    |    | 5     | 14    | 5     | 14  | 14:45     |    |    | 136   | 581   | 148   | 579   | 284 | 1160 |  |  |  |        |
| 3:00         |    |    | 2     | 4     | 6     |     | 15:00     |    |    | 165   | 145   | 310   |       |     |      |  |  |  |        |
| 3:15         |    |    | 3     | 6     | 9     |     | 15:15     |    |    | 141   | 154   | 295   |       |     |      |  |  |  |        |
| 3:30         |    |    | 6     | 2     | 8     |     | 15:30     |    |    | 180   | 166   | 346   |       |     |      |  |  |  |        |
| 3:45         |    |    | 2     | 13    | 5     | 17  | 15:45     |    |    | 149   | 635   | 160   | 625   | 309 | 1260 |  |  |  |        |
| 4:00         |    |    | 4     | 3     | 7     |     | 16:00     |    |    | 165   | 181   | 346   |       |     |      |  |  |  |        |
| 4:15         |    |    | 5     | 6     | 11    |     | 16:15     |    |    | 157   | 164   | 321   |       |     |      |  |  |  |        |
| 4:30         |    |    | 6     | 7     | 13    |     | 16:30     |    |    | 146   | 171   | 317   |       |     |      |  |  |  |        |
| 4:45         |    |    | 12    | 27    | 8     | 24  | 16:45     |    |    | 133   | 601   | 180   | 696   | 313 | 1297 |  |  |  |        |
| 5:00         |    |    | 8     | 8     | 16    |     | 17:00     |    |    | 186   | 186   | 372   |       |     |      |  |  |  |        |
| 5:15         |    |    | 9     | 8     | 17    |     | 17:15     |    |    | 148   | 165   | 313   |       |     |      |  |  |  |        |
| 5:30         |    |    | 8     | 18    | 26    |     | 17:30     |    |    | 133   | 164   | 297   |       |     |      |  |  |  |        |
| 5:45         |    |    | 10    | 35    | 18    | 52  | 17:45     |    |    | 116   | 583   | 141   | 656   | 257 | 1239 |  |  |  |        |
| 6:00         |    |    | 15    | 24    | 39    |     | 18:00     |    |    | 133   | 140   | 273   |       |     |      |  |  |  |        |
| 6:15         |    |    | 17    | 21    | 38    |     | 18:15     |    |    | 118   | 128   | 246   |       |     |      |  |  |  |        |
| 6:30         |    |    | 29    | 26    | 55    |     | 18:30     |    |    | 123   | 113   | 236   |       |     |      |  |  |  |        |
| 6:45         |    |    | 32    | 93    | 31    | 102 | 18:45     |    |    | 127   | 501   | 87    | 468   | 214 | 969  |  |  |  |        |
| 7:00         |    |    | 32    | 33    | 65    |     | 19:00     |    |    | 134   | 103   | 237   |       |     |      |  |  |  |        |
| 7:15         |    |    | 51    | 42    | 93    |     | 19:15     |    |    | 125   | 111   | 236   |       |     |      |  |  |  |        |
| 7:30         |    |    | 59    | 58    | 117   |     | 19:30     |    |    | 105   | 95    | 200   |       |     |      |  |  |  |        |
| 7:45         |    |    | 85    | 227   | 64    | 197 | 19:45     |    |    | 112   | 476   | 80    | 389   | 192 | 865  |  |  |  |        |
| 8:00         |    |    | 86    | 69    | 155   |     | 20:00     |    |    | 71    | 66    | 137   |       |     |      |  |  |  |        |
| 8:15         |    |    | 75    | 75    | 150   |     | 20:15     |    |    | 75    | 61    | 136   |       |     |      |  |  |  |        |
| 8:30         |    |    | 85    | 86    | 171   |     | 20:30     |    |    | 50    | 53    | 103   |       |     |      |  |  |  |        |
| 8:45         |    |    | 85    | 331   | 86    | 316 | 20:45     |    |    | 60    | 256   | 31    | 211   | 91  | 467  |  |  |  |        |
| 9:00         |    |    | 90    | 88    | 178   |     | 21:00     |    |    | 34    | 49    | 83    |       |     |      |  |  |  |        |
| 9:15         |    |    | 81    | 105   | 186   |     | 21:15     |    |    | 37    | 30    | 67    |       |     |      |  |  |  |        |
| 9:30         |    |    | 113   | 112   | 225   |     | 21:30     |    |    | 40    | 32    | 72    |       |     |      |  |  |  |        |
| 9:45         |    |    | 136   | 420   | 124   | 429 | 21:45     |    |    | 32    | 143   | 24    | 135   | 56  | 278  |  |  |  |        |
| 10:00        |    |    | 127   | 112   | 239   |     | 22:00     |    |    | 21    | 24    | 45    |       |     |      |  |  |  |        |
| 10:15        |    |    | 115   | 158   | 273   |     | 22:15     |    |    | 24    | 27    | 51    |       |     |      |  |  |  |        |
| 10:30        |    |    | 135   | 127   | 262   |     | 22:30     |    |    | 26    | 14    | 40    |       |     |      |  |  |  |        |
| 10:45        |    |    | 144   | 521   | 170   | 567 | 22:45     |    |    | 20    | 91    | 19    | 84    | 39  | 175  |  |  |  |        |
| 11:00        |    |    | 150   | 151   | 301   |     | 23:00     |    |    | 16    | 11    | 27    |       |     |      |  |  |  |        |
| 11:15        |    |    | 153   | 175   | 328   |     | 23:15     |    |    | 19    | 11    | 30    |       |     |      |  |  |  |        |
| 11:30        |    |    | 133   | 156   | 289   |     | 23:30     |    |    | 16    | 8     | 24    |       |     |      |  |  |  |        |
| 11:45        |    |    | 153   | 589   | 183   | 665 | 23:45     |    |    | 11    | 62    | 10    | 40    | 21  | 102  |  |  |  |        |
| TOTALS       |    |    | 2321  | 2435  | 4756  |     | TOTALS    |    |    | 5327  | 5288  | 10615 |       |     |      |  |  |  |        |
| SPLIT %      |    |    | 48.8% | 51.2% | 30.9% |     | SPLIT %   |    |    | 50.2% | 49.8% | 69.1% |       |     |      |  |  |  |        |

| DAILY TOTALS    |       |       |       |       | NB    | SB |                 |       |       |       |       | EB    | WB    |  |  |  |  |  | Total  |
|-----------------|-------|-------|-------|-------|-------|----|-----------------|-------|-------|-------|-------|-------|-------|--|--|--|--|--|--------|
|                 |       |       |       |       | 0     | 0  |                 |       |       |       |       | 7,648 | 7,723 |  |  |  |  |  | 15,371 |
| AM Peak Hour    |       |       | 11:45 | 11:45 | 11:45 |    | PM Peak Hour    |       |       | 12:15 | 12:00 | 12:00 |       |  |  |  |  |  |        |
| AM Pk Volume    |       |       | 701   | 764   | 1465  |    | PM Pk Volume    |       |       | 737   | 737   | 1469  |       |  |  |  |  |  |        |
| Pk Hr Factor    |       |       | 0.847 | 0.936 | 0.930 |    | Pk Hr Factor    |       |       | 0.890 | 0.903 | 0.932 |       |  |  |  |  |  |        |
| 7 - 9 Volume    | 0     | 0     | 558   | 513   | 1071  |    | 4 - 6 Volume    | 0     | 0     | 1184  | 1352  | 2536  |       |  |  |  |  |  |        |
| 7 - 9 Peak Hour |       |       | 7:45  | 8:00  | 8:00  |    | 4 - 6 Peak Hour |       |       | 16:15 | 16:30 | 16:15 |       |  |  |  |  |  |        |
| 7 - 9 Pk Volume | 0     | 0     | 331   | 316   | 647   |    | 4 - 6 Pk Volume | 0     | 0     | 622   | 702   | 1323  |       |  |  |  |  |  |        |
| Pk Hr Factor    | 0.000 | 0.000 | 0.962 | 0.919 | 0.946 |    | Pk Hr Factor    | 0.000 | 0.000 | 0.836 | 0.944 | 0.889 |       |  |  |  |  |  |        |

**VOLUME**

Glendale Ave W/O 12th Ave

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_003

| DAILY TOTALS |    |    |       |       | NB    | SB |           |    |    |       |       | EB    | WB    | Total |     |
|--------------|----|----|-------|-------|-------|----|-----------|----|----|-------|-------|-------|-------|-------|-----|
|              |    |    |       |       | 0     | 0  |           |    |    |       |       | 1,622 | 1,183 | 2,805 |     |
| AM Period    | NB | SB | EB    | WB    | TOTAL |    | PM Period | NB | SB | EB    | WB    | TOTAL |       |       |     |
| 0:00         |    |    | 6     | 4     | 10    |    | 12:00     |    |    | 24    | 19    | 43    |       |       |     |
| 0:15         |    |    | 10    | 2     | 12    |    | 12:15     |    |    | 26    | 17    | 43    |       |       |     |
| 0:30         |    |    | 11    | 0     | 11    |    | 12:30     |    |    | 31    | 25    | 56    |       |       |     |
| 0:45         |    |    | 5     | 32    | 2     | 8  | 12:45     |    |    | 22    | 103   | 18    | 79    | 40    | 182 |
| 1:00         |    |    | 4     | 1     | 5     |    | 13:00     |    |    | 23    | 17    | 40    |       |       |     |
| 1:15         |    |    | 6     | 0     | 6     |    | 13:15     |    |    | 26    | 28    | 54    |       |       |     |
| 1:30         |    |    | 2     | 2     | 4     |    | 13:30     |    |    | 21    | 11    | 32    |       |       |     |
| 1:45         |    |    | 10    | 22    | 3     | 6  | 13:45     |    |    | 19    | 89    | 12    | 68    | 31    | 157 |
| 2:00         |    |    | 2     | 0     | 2     |    | 14:00     |    |    | 25    | 20    | 45    |       |       |     |
| 2:15         |    |    | 2     | 0     | 2     |    | 14:15     |    |    | 31    | 18    | 49    |       |       |     |
| 2:30         |    |    | 4     | 1     | 5     |    | 14:30     |    |    | 33    | 24    | 57    |       |       |     |
| 2:45         |    |    | 3     | 11    | 0     | 1  | 14:45     |    |    | 29    | 118   | 21    | 83    | 50    | 201 |
| 3:00         |    |    | 7     | 8     | 15    |    | 15:00     |    |    | 33    | 24    | 57    |       |       |     |
| 3:15         |    |    | 3     | 2     | 5     |    | 15:15     |    |    | 37    | 22    | 59    |       |       |     |
| 3:30         |    |    | 3     | 0     | 3     |    | 15:30     |    |    | 28    | 16    | 44    |       |       |     |
| 3:45         |    |    | 7     | 20    | 2     | 12 | 15:45     |    |    | 34    | 132   | 16    | 78    | 50    | 210 |
| 4:00         |    |    | 6     | 1     | 7     |    | 16:00     |    |    | 36    | 30    | 66    |       |       |     |
| 4:15         |    |    | 10    | 3     | 13    |    | 16:15     |    |    | 20    | 27    | 47    |       |       |     |
| 4:30         |    |    | 10    | 2     | 12    |    | 16:30     |    |    | 28    | 22    | 50    |       |       |     |
| 4:45         |    |    | 8     | 34    | 3     | 9  | 16:45     |    |    | 35    | 119   | 37    | 116   | 72    | 235 |
| 5:00         |    |    | 10    | 0     | 10    |    | 17:00     |    |    | 33    | 36    | 69    |       |       |     |
| 5:15         |    |    | 18    | 3     | 21    |    | 17:15     |    |    | 40    | 27    | 67    |       |       |     |
| 5:30         |    |    | 11    | 0     | 11    |    | 17:30     |    |    | 21    | 20    | 41    |       |       |     |
| 5:45         |    |    | 14    | 53    | 4     | 7  | 17:45     |    |    | 29    | 123   | 37    | 120   | 66    | 243 |
| 6:00         |    |    | 7     | 5     | 12    |    | 18:00     |    |    | 34    | 20    | 54    |       |       |     |
| 6:15         |    |    | 12    | 6     | 18    |    | 18:15     |    |    | 17    | 22    | 39    |       |       |     |
| 6:30         |    |    | 12    | 9     | 21    |    | 18:30     |    |    | 29    | 15    | 44    |       |       |     |
| 6:45         |    |    | 11    | 42    | 10    | 30 | 18:45     |    |    | 25    | 105   | 10    | 67    | 35    | 172 |
| 7:00         |    |    | 7     | 17    | 24    |    | 19:00     |    |    | 25    | 10    | 35    |       |       |     |
| 7:15         |    |    | 17    | 17    | 34    |    | 19:15     |    |    | 28    | 21    | 49    |       |       |     |
| 7:30         |    |    | 14    | 16    | 30    |    | 19:30     |    |    | 31    | 9     | 40    |       |       |     |
| 7:45         |    |    | 13    | 51    | 22    | 72 | 19:45     |    |    | 18    | 102   | 12    | 52    | 30    | 154 |
| 8:00         |    |    | 11    | 21    | 32    |    | 20:00     |    |    | 23    | 13    | 36    |       |       |     |
| 8:15         |    |    | 10    | 24    | 34    |    | 20:15     |    |    | 17    | 8     | 25    |       |       |     |
| 8:30         |    |    | 9     | 14    | 23    |    | 20:30     |    |    | 16    | 9     | 25    |       |       |     |
| 8:45         |    |    | 10    | 40    | 12    | 71 | 20:45     |    |    | 20    | 76    | 12    | 42    | 32    | 118 |
| 9:00         |    |    | 13    | 20    | 33    |    | 21:00     |    |    | 15    | 6     | 21    |       |       |     |
| 9:15         |    |    | 11    | 18    | 29    |    | 21:15     |    |    | 23    | 5     | 28    |       |       |     |
| 9:30         |    |    | 12    | 18    | 30    |    | 21:30     |    |    | 19    | 7     | 26    |       |       |     |
| 9:45         |    |    | 25    | 61    | 11    | 67 | 21:45     |    |    | 12    | 69    | 2     | 20    | 14    | 89  |
| 10:00        |    |    | 18    | 22    | 40    |    | 22:00     |    |    | 10    | 3     | 13    |       |       |     |
| 10:15        |    |    | 17    | 13    | 30    |    | 22:15     |    |    | 13    | 3     | 16    |       |       |     |
| 10:30        |    |    | 16    | 13    | 29    |    | 22:30     |    |    | 9     | 2     | 11    |       |       |     |
| 10:45        |    |    | 21    | 72    | 32    | 80 | 22:45     |    |    | 4     | 36    | 5     | 13    | 9     | 49  |
| 11:00        |    |    | 20    | 17    | 37    |    | 23:00     |    |    | 8     | 4     | 12    |       |       |     |
| 11:15        |    |    | 23    | 12    | 35    |    | 23:15     |    |    | 9     | 5     | 14    |       |       |     |
| 11:30        |    |    | 18    | 20    | 38    |    | 23:30     |    |    | 7     | 3     | 10    |       |       |     |
| 11:45        |    |    | 21    | 82    | 18    | 67 | 23:45     |    |    | 6     | 30    | 3     | 15    | 9     | 45  |
| TOTALS       |    |    | 520   | 430   | 950   |    | TOTALS    |    |    | 1102  | 753   | 1855  |       |       |     |
| SPLIT %      |    |    | 54.7% | 45.3% | 33.9% |    | SPLIT %   |    |    | 59.4% | 40.6% | 66.1% |       |       |     |

| DAILY TOTALS    |       |       |       |       | NB    | SB |                 |       |       |       |       | EB    | WB    | Total |  |
|-----------------|-------|-------|-------|-------|-------|----|-----------------|-------|-------|-------|-------|-------|-------|-------|--|
|                 |       |       |       |       | 0     | 0  |                 |       |       |       |       | 1,622 | 1,183 | 2,805 |  |
| AM Peak Hour    |       |       | 11:45 | 7:30  | 11:45 |    | PM Peak Hour    |       |       | 16:30 | 16:15 | 16:30 |       |       |  |
| AM Pk Volume    |       |       | 102   | 83    | 181   |    | PM Pk Volume    |       |       | 136   | 122   | 258   |       |       |  |
| Pk Hr Factor    |       |       | 0.823 | 0.865 | 0.808 |    | Pk Hr Factor    |       |       | 0.850 | 0.824 | 0.896 |       |       |  |
| 7 - 9 Volume    | 0     | 0     | 91    | 143   | 234   |    | 4 - 6 Volume    | 0     | 0     | 242   | 236   | 478   |       |       |  |
| 7 - 9 Peak Hour |       |       | 7:15  | 7:30  | 7:15  |    | 4 - 6 Peak Hour |       |       | 16:30 | 16:15 | 16:30 |       |       |  |
| 7 - 9 Pk Volume | 0     | 0     | 55    | 83    | 131   |    | 4 - 6 Pk Volume | 0     | 0     | 136   | 122   | 258   |       |       |  |
| Pk Hr Factor    | 0.000 | 0.000 | 0.809 | 0.865 | 0.936 |    | Pk Hr Factor    | 0.000 | 0.000 | 0.850 | 0.824 | 0.896 |       |       |  |



**VOLUME**

12th Ave Bet. Mall Dr &amp; Glendale Ave

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_002

| DAILY TOTALS |       |       |     |      | NB     | SB     |           |       |       |     |      | EB    | WB   |  |  |  |  |  | Total  |
|--------------|-------|-------|-----|------|--------|--------|-----------|-------|-------|-----|------|-------|------|--|--|--|--|--|--------|
|              |       |       |     |      | 16,391 | 17,139 |           |       |       |     |      | 0     | 0    |  |  |  |  |  | 33,530 |
| AM Period    | NB    | SB    | EB  | WB   | TOTAL  |        | PM Period | NB    | SB    | EB  | WB   | TOTAL |      |  |  |  |  |  | TOTAL  |
| 0:00         | 33    | 39    |     |      | 72     |        | 12:00     | 271   | 313   |     |      | 584   |      |  |  |  |  |  | 584    |
| 0:15         | 26    | 26    |     |      | 52     |        | 12:15     | 283   | 267   |     |      | 550   |      |  |  |  |  |  | 550    |
| 0:30         | 13    | 21    |     |      | 34     |        | 12:30     | 296   | 280   |     |      | 576   |      |  |  |  |  |  | 576    |
| 0:45         | 17    | 89    | 22  | 108  | 39     | 197    | 12:45     | 314   | 1164  | 268 | 1128 | 582   | 2292 |  |  |  |  |  | 2292   |
| 1:00         | 17    | 39    |     |      | 56     |        | 13:00     | 264   | 293   |     |      | 557   |      |  |  |  |  |  | 557    |
| 1:15         | 14    | 27    |     |      | 41     |        | 13:15     | 260   | 295   |     |      | 555   |      |  |  |  |  |  | 555    |
| 1:30         | 17    | 17    |     |      | 34     |        | 13:30     | 261   | 287   |     |      | 548   |      |  |  |  |  |  | 548    |
| 1:45         | 25    | 73    | 23  | 106  | 48     | 179    | 13:45     | 314   | 1099  | 292 | 1167 | 606   | 2266 |  |  |  |  |  | 2266   |
| 2:00         | 17    | 16    |     |      | 33     |        | 14:00     | 241   | 338   |     |      | 579   |      |  |  |  |  |  | 579    |
| 2:15         | 11    | 17    |     |      | 28     |        | 14:15     | 290   | 307   |     |      | 597   |      |  |  |  |  |  | 597    |
| 2:30         | 4     | 15    |     |      | 19     |        | 14:30     | 295   | 304   |     |      | 599   |      |  |  |  |  |  | 599    |
| 2:45         | 17    | 49    | 12  | 60   | 29     | 109    | 14:45     | 298   | 1124  | 312 | 1261 | 610   | 2385 |  |  |  |  |  | 2385   |
| 3:00         | 17    | 20    |     |      | 37     |        | 15:00     | 281   | 349   |     |      | 630   |      |  |  |  |  |  | 630    |
| 3:15         | 10    | 6     |     |      | 16     |        | 15:15     | 307   | 317   |     |      | 624   |      |  |  |  |  |  | 624    |
| 3:30         | 23    | 13    |     |      | 36     |        | 15:30     | 314   | 319   |     |      | 633   |      |  |  |  |  |  | 633    |
| 3:45         | 43    | 93    | 17  | 56   | 60     | 149    | 15:45     | 337   | 1239  | 322 | 1307 | 659   | 2546 |  |  |  |  |  | 2546   |
| 4:00         | 22    | 30    |     |      | 52     |        | 16:00     | 333   | 350   |     |      | 683   |      |  |  |  |  |  | 683    |
| 4:15         | 29    | 35    |     |      | 64     |        | 16:15     | 310   | 345   |     |      | 655   |      |  |  |  |  |  | 655    |
| 4:30         | 40    | 38    |     |      | 78     |        | 16:30     | 336   | 338   |     |      | 674   |      |  |  |  |  |  | 674    |
| 4:45         | 44    | 135   | 50  | 153  | 94     | 288    | 16:45     | 348   | 1327  | 345 | 1378 | 693   | 2705 |  |  |  |  |  | 2705   |
| 5:00         | 54    | 83    |     |      | 137    |        | 17:00     | 355   | 431   |     |      | 786   |      |  |  |  |  |  | 786    |
| 5:15         | 48    | 79    |     |      | 127    |        | 17:15     | 339   | 399   |     |      | 738   |      |  |  |  |  |  | 738    |
| 5:30         | 63    | 92    |     |      | 155    |        | 17:30     | 344   | 343   |     |      | 687   |      |  |  |  |  |  | 687    |
| 5:45         | 102   | 267   | 91  | 345  | 193    | 612    | 17:45     | 303   | 1341  | 350 | 1523 | 653   | 2864 |  |  |  |  |  | 2864   |
| 6:00         | 90    | 112   |     |      | 202    |        | 18:00     | 293   | 322   |     |      | 615   |      |  |  |  |  |  | 615    |
| 6:15         | 91    | 89    |     |      | 180    |        | 18:15     | 310   | 327   |     |      | 637   |      |  |  |  |  |  | 637    |
| 6:30         | 112   | 117   |     |      | 229    |        | 18:30     | 295   | 311   |     |      | 606   |      |  |  |  |  |  | 606    |
| 6:45         | 171   | 464   | 128 | 446  | 299    | 910    | 18:45     | 286   | 1184  | 307 | 1267 | 593   | 2451 |  |  |  |  |  | 2451   |
| 7:00         | 138   | 137   |     |      | 275    |        | 19:00     | 248   | 310   |     |      | 558   |      |  |  |  |  |  | 558    |
| 7:15         | 202   | 152   |     |      | 354    |        | 19:15     | 203   | 287   |     |      | 490   |      |  |  |  |  |  | 490    |
| 7:30         | 223   | 195   |     |      | 418    |        | 19:30     | 214   | 302   |     |      | 516   |      |  |  |  |  |  | 516    |
| 7:45         | 303   | 866   | 157 | 641  | 460    | 1507   | 19:45     | 198   | 863   | 251 | 1150 | 449   | 2013 |  |  |  |  |  | 2013   |
| 8:00         | 216   | 165   |     |      | 381    |        | 20:00     | 160   | 236   |     |      | 396   |      |  |  |  |  |  | 396    |
| 8:15         | 199   | 158   |     |      | 357    |        | 20:15     | 145   | 206   |     |      | 351   |      |  |  |  |  |  | 351    |
| 8:30         | 195   | 125   |     |      | 320    |        | 20:30     | 143   | 221   |     |      | 364   |      |  |  |  |  |  | 364    |
| 8:45         | 220   | 830   | 130 | 578  | 350    | 1408   | 20:45     | 142   | 590   | 164 | 827  | 306   | 1417 |  |  |  |  |  | 1417   |
| 9:00         | 176   | 167   |     |      | 343    |        | 21:00     | 89    | 156   |     |      | 245   |      |  |  |  |  |  | 245    |
| 9:15         | 187   | 176   |     |      | 363    |        | 21:15     | 88    | 142   |     |      | 230   |      |  |  |  |  |  | 230    |
| 9:30         | 203   | 173   |     |      | 376    |        | 21:30     | 87    | 142   |     |      | 229   |      |  |  |  |  |  | 229    |
| 9:45         | 233   | 799   | 168 | 684  | 401    | 1483   | 21:45     | 87    | 351   | 103 | 543  | 190   | 894  |  |  |  |  |  | 894    |
| 10:00        | 215   | 163   |     |      | 378    |        | 22:00     | 61    | 115   |     |      | 176   |      |  |  |  |  |  | 176    |
| 10:15        | 242   | 201   |     |      | 443    |        | 22:15     | 57    | 88    |     |      | 145   |      |  |  |  |  |  | 145    |
| 10:30        | 245   | 191   |     |      | 436    |        | 22:30     | 70    | 89    |     |      | 159   |      |  |  |  |  |  | 159    |
| 10:45        | 264   | 966   | 246 | 801  | 510    | 1767   | 22:45     | 51    | 239   | 79  | 371  | 130   | 610  |  |  |  |  |  | 610    |
| 11:00        | 273   | 225   |     |      | 498    |        | 23:00     | 39    | 60    |     |      | 99    |      |  |  |  |  |  | 99     |
| 11:15        | 267   | 242   |     |      | 509    |        | 23:15     | 43    | 55    |     |      | 98    |      |  |  |  |  |  | 98     |
| 11:30        | 296   | 270   |     |      | 566    |        | 23:30     | 32    | 53    |     |      | 85    |      |  |  |  |  |  | 85     |
| 11:45        | 263   | 1099  | 296 | 1033 | 559    | 2132   | 23:45     | 26    | 140   | 38  | 206  | 64    | 346  |  |  |  |  |  | 346    |
| TOTALS       | 5730  | 5011  |     |      | 10741  |        | TOTALS    | 10661 | 12128 |     |      | 22789 |      |  |  |  |  |  | 22789  |
| SPLIT %      | 53.3% | 46.7% |     |      | 32.0%  |        | SPLIT %   | 46.8% | 53.2% |     |      | 68.0% |      |  |  |  |  |  | 68.0%  |

| DAILY TOTALS    |       |       |       |       | NB     | SB     |                 |       |       |       |       | EB    | WB |  |  |  |  |  | Total  |
|-----------------|-------|-------|-------|-------|--------|--------|-----------------|-------|-------|-------|-------|-------|----|--|--|--|--|--|--------|
|                 |       |       |       |       | 16,391 | 17,139 |                 |       |       |       |       | 0     | 0  |  |  |  |  |  | 33,530 |
| AM Peak Hour    | 11:30 | 11:45 |       |       | 11:45  |        | PM Peak Hour    | 16:45 | 17:00 |       |       | 16:45 |    |  |  |  |  |  | 16:45  |
| AM Pk Volume    | 1113  | 1156  |       |       | 2269   |        | PM Pk Volume    | 1386  | 1523  |       |       | 2904  |    |  |  |  |  |  | 2904   |
| Pk Hr Factor    | 0.940 | 0.923 |       |       | 0.971  |        | Pk Hr Factor    | 0.976 | 0.883 |       |       | 0.924 |    |  |  |  |  |  | 0.924  |
| 7 - 9 Volume    | 1696  | 1219  | 0     | 0     | 2915   |        | 4 - 6 Volume    | 2668  | 2901  | 0     | 0     | 5569  |    |  |  |  |  |  | 5569   |
| 7 - 9 Peak Hour | 7:15  | 7:30  |       |       | 7:30   |        | 4 - 6 Peak Hour | 16:45 | 17:00 |       |       | 16:45 |    |  |  |  |  |  | 16:45  |
| 7 - 9 Pk Volume | 944   | 675   | 0     | 0     | 1616   |        | 4 - 6 Pk Volume | 1386  | 1523  | 0     | 0     | 2904  |    |  |  |  |  |  | 2904   |
| Pk Hr Factor    | 0.779 | 0.865 | 0.000 | 0.000 | 0.878  |        | Pk Hr Factor    | 0.976 | 0.883 | 0.000 | 0.000 | 0.924 |    |  |  |  |  |  | 0.924  |

**VOLUME**

Grangeville Blvd W/O 12th Ave

Day: Thursday  
Date: 10/1/2020City: Hanford  
Project #: CA20\_90150\_001

| DAILY TOTALS |    |    |       |       | NB    | SB  |           |    |    |       |       | EB    | WB    | Total  |     |  |
|--------------|----|----|-------|-------|-------|-----|-----------|----|----|-------|-------|-------|-------|--------|-----|--|
|              |    |    |       |       | 0     | 0   |           |    |    |       |       | 4,956 | 5,086 | 10,042 |     |  |
| AM Period    | NB | SB | EB    | WB    | TOTAL |     | PM Period | NB | SB | EB    | WB    | TOTAL |       |        |     |  |
| 00:00        |    |    | 4     | 9     | 13    |     | 12:00     |    |    | 85    | 83    | 168   |       |        |     |  |
| 00:15        |    |    | 12    | 12    | 24    |     | 12:15     |    |    | 54    | 63    | 117   |       |        |     |  |
| 00:30        |    |    | 5     | 4     | 9     |     | 12:30     |    |    | 66    | 83    | 149   |       |        |     |  |
| 00:45        |    |    | 4     | 25    | 7     | 32  | 12:45     |    |    | 110   | 315   | 84    | 313   | 194    | 628 |  |
| 01:00        |    |    | 7     | 4     | 11    |     | 13:00     |    |    | 86    | 81    | 167   |       |        |     |  |
| 01:15        |    |    | 8     | 4     | 12    |     | 13:15     |    |    | 80    | 81    | 161   |       |        |     |  |
| 01:30        |    |    | 6     | 2     | 8     |     | 13:30     |    |    | 72    | 75    | 147   |       |        |     |  |
| 01:45        |    |    | 3     | 24    | 2     | 12  | 13:45     |    |    | 70    | 308   | 74    | 311   | 144    | 619 |  |
| 02:00        |    |    | 6     | 4     | 10    |     | 14:00     |    |    | 84    | 81    | 165   |       |        |     |  |
| 02:15        |    |    | 3     | 2     | 5     |     | 14:15     |    |    | 72    | 85    | 157   |       |        |     |  |
| 02:30        |    |    | 3     | 3     | 6     |     | 14:30     |    |    | 103   | 95    | 198   |       |        |     |  |
| 02:45        |    |    | 11    | 23    | 3     | 12  | 14:45     |    |    | 107   | 366   | 78    | 339   | 185    | 705 |  |
| 03:00        |    |    | 3     | 5     | 8     |     | 15:00     |    |    | 94    | 88    | 182   |       |        |     |  |
| 03:15        |    |    | 3     | 5     | 8     |     | 15:15     |    |    | 121   | 81    | 202   |       |        |     |  |
| 03:30        |    |    | 6     | 4     | 10    |     | 15:30     |    |    | 113   | 83    | 196   |       |        |     |  |
| 03:45        |    |    | 12    | 24    | 10    | 24  | 15:45     |    |    | 120   | 448   | 86    | 338   | 206    | 786 |  |
| 04:00        |    |    | 5     | 9     | 14    |     | 16:00     |    |    | 89    | 114   | 203   |       |        |     |  |
| 04:15        |    |    | 4     | 11    | 15    |     | 16:15     |    |    | 113   | 79    | 192   |       |        |     |  |
| 04:30        |    |    | 8     | 8     | 16    |     | 16:30     |    |    | 115   | 105   | 220   |       |        |     |  |
| 04:45        |    |    | 8     | 25    | 27    | 55  | 16:45     |    |    | 127   | 444   | 98    | 396   | 225    | 840 |  |
| 05:00        |    |    | 10    | 28    | 38    |     | 17:00     |    |    | 104   | 119   | 223   |       |        |     |  |
| 05:15        |    |    | 21    | 38    | 59    |     | 17:15     |    |    | 104   | 92    | 196   |       |        |     |  |
| 05:30        |    |    | 23    | 34    | 57    |     | 17:30     |    |    | 106   | 93    | 199   |       |        |     |  |
| 05:45        |    |    | 26    | 80    | 33    | 133 | 17:45     |    |    | 69    | 383   | 100   | 404   | 169    | 787 |  |
| 06:00        |    |    | 25    | 58    | 83    |     | 18:00     |    |    | 73    | 109   | 182   |       |        |     |  |
| 06:15        |    |    | 24    | 54    | 78    |     | 18:15     |    |    | 76    | 76    | 152   |       |        |     |  |
| 06:30        |    |    | 36    | 62    | 98    |     | 18:30     |    |    | 67    | 77    | 144   |       |        |     |  |
| 06:45        |    |    | 37    | 122   | 64    | 238 | 18:45     |    |    | 66    | 282   | 78    | 340   | 144    | 622 |  |
| 07:00        |    |    | 46    | 60    | 106   |     | 19:00     |    |    | 67    | 77    | 144   |       |        |     |  |
| 07:15        |    |    | 66    | 57    | 123   |     | 19:15     |    |    | 79    | 79    | 158   |       |        |     |  |
| 07:30        |    |    | 73    | 72    | 145   |     | 19:30     |    |    | 62    | 52    | 114   |       |        |     |  |
| 07:45        |    |    | 111   | 296   | 103   | 292 | 19:45     |    |    | 57    | 265   | 54    | 262   | 111    | 527 |  |
| 08:00        |    |    | 68    | 86    | 154   |     | 20:00     |    |    | 36    | 54    | 90    |       |        |     |  |
| 08:15        |    |    | 65    | 71    | 136   |     | 20:15     |    |    | 50    | 43    | 93    |       |        |     |  |
| 08:30        |    |    | 70    | 60    | 130   |     | 20:30     |    |    | 40    | 42    | 82    |       |        |     |  |
| 08:45        |    |    | 66    | 269   | 64    | 281 | 20:45     |    |    | 31    | 157   | 32    | 171   | 63     | 328 |  |
| 09:00        |    |    | 60    | 53    | 113   |     | 21:00     |    |    | 34    | 43    | 77    |       |        |     |  |
| 09:15        |    |    | 63    | 65    | 128   |     | 21:15     |    |    | 23    | 48    | 71    |       |        |     |  |
| 09:30        |    |    | 57    | 52    | 109   |     | 21:30     |    |    | 27    | 30    | 57    |       |        |     |  |
| 09:45        |    |    | 66    | 246   | 82    | 252 | 21:45     |    |    | 29    | 113   | 26    | 147   | 55     | 260 |  |
| 10:00        |    |    | 73    | 58    | 131   |     | 22:00     |    |    | 19    | 26    | 45    |       |        |     |  |
| 10:15        |    |    | 68    | 77    | 145   |     | 22:15     |    |    | 14    | 14    | 28    |       |        |     |  |
| 10:30        |    |    | 76    | 64    | 140   |     | 22:30     |    |    | 16    | 15    | 31    |       |        |     |  |
| 10:45        |    |    | 80    | 297   | 78    | 277 | 22:45     |    |    | 19    | 68    | 14    | 69    | 33     | 137 |  |
| 11:00        |    |    | 72    | 80    | 152   |     | 23:00     |    |    | 17    | 22    | 39    |       |        |     |  |
| 11:15        |    |    | 87    | 87    | 174   |     | 23:15     |    |    | 15    | 12    | 27    |       |        |     |  |
| 11:30        |    |    | 64    | 65    | 129   |     | 23:30     |    |    | 23    | 18    | 41    |       |        |     |  |
| 11:45        |    |    | 77    | 300   | 93    | 325 | 23:45     |    |    | 21    | 76    | 11    | 63    | 32     | 139 |  |
| TOTALS       |    |    | 1731  | 1933  | 3664  |     | TOTALS    |    |    | 3225  | 3153  | 6378  |       |        |     |  |
| SPLIT %      |    |    | 47.2% | 52.8% | 36.5% |     | SPLIT %   |    |    | 50.6% | 49.4% | 63.5% |       |        |     |  |

| DAILY TOTALS    |       |       |       |       | NB    | SB |                 |       |       |       |       | EB    | WB    | Total  |  |  |
|-----------------|-------|-------|-------|-------|-------|----|-----------------|-------|-------|-------|-------|-------|-------|--------|--|--|
|                 |       |       |       |       | 0     | 0  |                 |       |       |       |       | 4,956 | 5,086 | 10,042 |  |  |
| AM Peak Hour    |       |       | 07:15 | 07:30 | 07:30 |    | PM Peak Hour    |       |       | 16:15 | 16:30 | 16:30 |       |        |  |  |
| AM Pk Volume    |       |       | 318   | 332   | 649   |    | PM Pk Volume    |       |       | 459   | 414   | 864   |       |        |  |  |
| Pk Hr Factor    |       |       | 0.716 | 0.806 | 0.758 |    | Pk Hr Factor    |       |       | 0.904 | 0.870 | 0.960 |       |        |  |  |
| 7 - 9 Volume    | 0     | 0     | 565   | 573   | 1138  |    | 4 - 6 Volume    | 0     | 0     | 827   | 800   | 1627  |       |        |  |  |
| 7 - 9 Peak Hour |       |       | 07:15 | 07:30 | 07:30 |    | 4 - 6 Peak Hour |       |       | 16:15 | 16:30 | 16:30 |       |        |  |  |
| 7 - 9 Pk Volume | 0     | 0     | 318   | 332   | 649   |    | 4 - 6 Pk Volume | 0     | 0     | 459   | 414   | 864   |       |        |  |  |
| Pk Hr Factor    | 0.000 | 0.000 | 0.716 | 0.806 | 0.758 |    | Pk Hr Factor    | 0.000 | 0.000 | 0.904 | 0.870 | 0.960 |       |        |  |  |

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** 11th Ave & 7th St  
**City:** Hanford  
**Control:** Signalized

**Project ID:** Historical  
**Date:** 7/23/2019

### Total

| NS/EW Streets:  |  | 11th Ave            |         |         |         | 11th Ave   |         |         |         | 7th St    |           |           |         | 7th St    |           |           |         |       |
|-----------------|--|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|-----------|-----------|---------|-----------|-----------|-----------|---------|-------|
| AM              |  | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |           |           |         | WESTBOUND |           |           |         |       |
|                 |  | 1<br>NL             | 2<br>NT | 1<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 2<br>EL   | 1.5<br>ET | 0.5<br>ER | 0<br>EU | 1<br>WL   | 1.5<br>WT | 0.5<br>WR | 0<br>WU | TOTAL |
| 7:00 AM         |  | 17                  | 51      | 3       | 0       | 13         | 71      | 4       | 0       | 6         | 10        | 10        | 0       | 18        | 7         | 6         | 0       | 216   |
| 7:15 AM         |  | 18                  | 67      | 11      | 5       | 8          | 79      | 7       | 0       | 5         | 19        | 20        | 0       | 10        | 14        | 5         | 0       | 268   |
| 7:30 AM         |  | 28                  | 76      | 22      | 1       | 11         | 83      | 8       | 0       | 9         | 20        | 10        | 0       | 14        | 26        | 9         | 0       | 317   |
| 7:45 AM         |  | 42                  | 134     | 27      | 6       | 20         | 87      | 21      | 0       | 8         | 20        | 15        | 0       | 7         | 25        | 8         | 0       | 420   |
| 8:00 AM         |  | 34                  | 94      | 29      | 2       | 15         | 65      | 15      | 0       | 10        | 17        | 9         | 0       | 22        | 18        | 16        | 0       | 346   |
| 8:15 AM         |  | 27                  | 108     | 23      | 1       | 14         | 62      | 14      | 1       | 6         | 21        | 15        | 0       | 18        | 20        | 14        | 0       | 344   |
| 8:30 AM         |  | 35                  | 88      | 17      | 4       | 20         | 72      | 13      | 0       | 12        | 29        | 26        | 0       | 25        | 26        | 9         | 0       | 376   |
| 8:45 AM         |  | 25                  | 114     | 27      | 1       | 19         | 80      | 16      | 0       | 12        | 26        | 23        | 0       | 23        | 25        | 14        | 0       | 405   |
| TOTAL VOLUMES:  |  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET        | ER        | EU      | WL        | WT        | WR        | WU      | TOTAL |
| APPROACH %'s:   |  | 226                 | 732     | 159     | 20      | 120        | 599     | 98      | 1       | 68        | 162       | 128       | 0       | 137       | 161       | 81        | 0       | 2692  |
| PEAK HR:        |  | 07:45 AM - 08:45 AM |         |         |         |            |         |         |         |           |           |           |         |           |           |           |         | TOTAL |
| PEAK HR VOL:    |  | 138                 | 424     | 96      | 13      | 69         | 286     | 63      | 1       | 36        | 87        | 65        | 0       | 72        | 89        | 47        | 0       | 1486  |
| PEAK HR FACTOR: |  | 0.821               | 0.791   | 0.828   | 0.542   | 0.863      | 0.822   | 0.750   | 0.250   | 0.750     | 0.750     | 0.625     | 0.000   | 0.720     | 0.856     | 0.734     | 0.000   | 0.885 |
|                 |  | 0.803               |         |         |         | 0.818      |         |         |         | 0.701     |           |           |         | 0.867     |           |           |         |       |

| PM              |  | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |           |           |         | WESTBOUND |           |           |         | TOTAL |
|-----------------|--|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|-----------|-----------|---------|-----------|-----------|-----------|---------|-------|
|                 |  | 1<br>NL             | 2<br>NT | 1<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 2<br>EL   | 1.5<br>ET | 0.5<br>ER | 0<br>EU | 1<br>WL   | 1.5<br>WT | 0.5<br>WR | 0<br>WU |       |
| 4:00 PM         |  | 22                  | 161     | 28      | 4       | 26         | 140     | 15      | 1       | 21        | 36        | 45        | 0       | 39        | 46        | 22        | 0       | 606   |
| 4:15 PM         |  | 38                  | 142     | 35      | 10      | 19         | 119     | 18      | 4       | 18        | 40        | 34        | 0       | 37        | 38        | 29        | 0       | 581   |
| 4:30 PM         |  | 32                  | 142     | 33      | 6       | 27         | 120     | 8       | 1       | 21        | 52        | 61        | 0       | 43        | 38        | 30        | 0       | 614   |
| 4:45 PM         |  | 33                  | 132     | 26      | 7       | 31         | 126     | 12      | 1       | 16        | 43        | 48        | 0       | 37        | 38        | 21        | 0       | 571   |
| 5:00 PM         |  | 35                  | 156     | 19      | 3       | 23         | 176     | 13      | 3       | 11        | 38        | 72        | 0       | 43        | 45        | 27        | 0       | 664   |
| 5:15 PM         |  | 38                  | 127     | 29      | 10      | 20         | 152     | 17      | 0       | 18        | 45        | 41        | 0       | 27        | 30        | 23        | 0       | 577   |
| 5:30 PM         |  | 30                  | 123     | 24      | 5       | 20         | 133     | 4       | 0       | 15        | 39        | 38        | 0       | 36        | 34        | 18        | 0       | 519   |
| 5:45 PM         |  | 23                  | 128     | 29      | 7       | 12         | 119     | 11      | 2       | 12        | 30        | 32        | 0       | 34        | 32        | 18        | 0       | 489   |
| TOTAL VOLUMES:  |  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET        | ER        | EU      | WL        | WT        | WR        | WU      | TOTAL |
| APPROACH %'s:   |  | 2531                | 1111    | 223     | 52      | 178        | 1085    | 98      | 12      | 132       | 323       | 371       | 0       | 296       | 301       | 188       | 0       | 4621  |
| PEAK HR:        |  | 04:15 PM - 05:15 PM |         |         |         |            |         |         |         |           |           |           |         |           |           |           |         | TOTAL |
| PEAK HR VOL:    |  | 138                 | 572     | 113     | 26      | 100        | 541     | 51      | 9       | 66        | 173       | 215       | 0       | 160       | 159       | 107       | 0       | 2430  |
| PEAK HR FACTOR: |  | 0.908               | 0.917   | 0.807   | 0.650   | 0.806      | 0.768   | 0.708   | 0.563   | 0.786     | 0.832     | 0.747     | 0.000   | 0.930     | 0.883     | 0.892     | 0.000   | 0.915 |
|                 |  | 0.943               |         |         |         | 0.815      |         |         |         | 0.847     |           |           |         | 0.926     |           |           |         |       |

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** S 11th Ave & W 6th St  
**City:** Hanford  
**Control:** 2-Way Stop(EB/WB)

**Project ID:** 20-090149-010  
**Date:** 10/1/2020

### Total

| NS/EW Streets:  |         | S 11th Ave          |         |         |         | S 11th Ave |         |         |         | W 6th St  |         |         |         | W 6th St  |         |         |         |       |       |
|-----------------|---------|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|-------|
| AM              |         | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         |       |       |
|                 |         | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 0<br>EL   | 0<br>ET | 1<br>ER | 0<br>EU | 0<br>WL   | 0<br>WT | 1<br>WR | 0<br>WU | TOTAL |       |
|                 | 7:00 AM | 10                  | 64      | 3       | 1       | 6          | 89      | 0       | 0       | 0         | 0       | 4       | 0       | 0         | 0       | 8       | 0       | 185   |       |
|                 | 7:15 AM | 9                   | 91      | 5       | 0       | 9          | 103     | 2       | 0       | 0         | 0       | 5       | 0       | 0         | 0       | 11      | 0       | 235   |       |
|                 | 7:30 AM | 13                  | 127     | 11      | 0       | 13         | 104     | 1       | 2       | 0         | 0       | 14      | 0       | 0         | 0       | 12      | 0       | 297   |       |
|                 | 7:45 AM | 26                  | 182     | 15      | 0       | 9          | 99      | 6       | 0       | 0         | 0       | 10      | 0       | 0         | 0       | 9       | 0       | 356   |       |
|                 | 8:00 AM | 22                  | 147     | 11      | 1       | 20         | 90      | 0       | 0       | 0         | 0       | 12      | 0       | 0         | 0       | 14      | 0       | 317   |       |
|                 | 8:15 AM | 14                  | 129     | 12      | 0       | 11         | 90      | 4       | 2       | 0         | 0       | 4       | 0       | 0         | 0       | 5       | 0       | 271   |       |
|                 | 8:30 AM | 15                  | 126     | 12      | 0       | 15         | 99      | 2       | 0       | 0         | 0       | 6       | 0       | 0         | 0       | 20      | 0       | 295   |       |
|                 | 8:45 AM | 16                  | 154     | 16      | 0       | 20         | 91      | 6       | 0       | 0         | 0       | 18      | 0       | 0         | 0       | 13      | 0       | 334   |       |
| TOTAL VOLUMES:  |         | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |       |
| APPROACH %'s:   |         | 125                 | 1020    | 85      | 2       | 103        | 765     | 21      | 4       | 0         | 0       | 73      | 0       | 0         | 0       | 92      | 0       | 2290  |       |
|                 |         | 10.15%              | 82.79%  | 6.90%   | 0.16%   | 11.53%     | 85.67%  | 2.35%   | 0.45%   | 0.00%     | 0.00%   | 100.00% | 0.00%   | 0.00%     | 0.00%   | 100.00% | 0.00%   |       |       |
| PEAK HR:        |         | 07:30 AM - 08:30 AM |         |         |         |            |         |         |         |           |         |         |         |           |         |         |         |       | TOTAL |
| PEAK HR VOL:    |         | 75                  | 585     | 49      | 1       | 53         | 383     | 11      | 4       | 0         | 0       | 40      | 0       | 0         | 0       | 40      | 0       | 1241  |       |
| PEAK HR FACTOR: |         | 0.721               | 0.804   | 0.817   | 0.250   | 0.663      | 0.921   | 0.458   | 0.500   | 0.000     | 0.000   | 0.714   | 0.000   | 0.000     | 0.000   | 0.714   | 0.000   | 0.871 |       |
|                 |         | 0.796               |         |         |         | 0.940      |         |         |         | 0.714     |         |         |         | 0.714     |         |         |         |       |       |

| PM              |         | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         |       |       |
|-----------------|---------|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|-------|
|                 |         | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 0<br>EL   | 0<br>ET | 1<br>ER | 0<br>EU | 0<br>WL   | 0<br>WT | 1<br>WR | 0<br>WU | TOTAL |       |
|                 | 4:00 PM | 11                  | 214     | 11      | 0       | 20         | 215     | 1       | 1       | 0         | 0       | 18      | 0       | 0         | 0       | 35      | 0       | 526   |       |
|                 | 4:15 PM | 19                  | 216     | 18      | 1       | 17         | 188     | 2       | 1       | 0         | 0       | 14      | 0       | 0         | 0       | 23      | 0       | 499   |       |
|                 | 4:30 PM | 13                  | 209     | 20      | 0       | 21         | 218     | 1       | 2       | 0         | 0       | 10      | 0       | 0         | 0       | 32      | 0       | 526   |       |
|                 | 4:45 PM | 24                  | 181     | 18      | 0       | 12         | 202     | 1       | 4       | 0         | 0       | 12      | 0       | 0         | 0       | 34      | 0       | 488   |       |
|                 | 5:00 PM | 18                  | 180     | 25      | 0       | 25         | 227     | 2       | 0       | 0         | 0       | 16      | 0       | 0         | 0       | 35      | 0       | 528   |       |
|                 | 5:15 PM | 11                  | 177     | 10      | 0       | 17         | 209     | 2       | 3       | 0         | 0       | 14      | 0       | 0         | 0       | 27      | 0       | 470   |       |
|                 | 5:30 PM | 12                  | 167     | 12      | 0       | 20         | 193     | 5       | 1       | 0         | 0       | 14      | 0       | 0         | 0       | 17      | 0       | 441   |       |
|                 | 5:45 PM | 9                   | 167     | 15      | 1       | 16         | 162     | 2       | 1       | 0         | 0       | 4       | 0       | 0         | 0       | 23      | 0       | 400   |       |
| TOTAL VOLUMES:  |         | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |       |
| APPROACH %'s:   |         | 117                 | 1511    | 129     | 2       | 148        | 1614    | 16      | 13      | 0         | 0       | 102     | 0       | 0         | 0       | 226     | 0       | 3878  |       |
|                 |         | 6.65%               | 85.90%  | 7.33%   | 0.11%   | 8.26%      | 90.12%  | 0.89%   | 0.73%   | 0.00%     | 0.00%   | 100.00% | 0.00%   | 0.00%     | 0.00%   | 100.00% | 0.00%   |       |       |
| PEAK HR:        |         | 04:15 PM - 05:15 PM |         |         |         |            |         |         |         |           |         |         |         |           |         |         |         |       | TOTAL |
| PEAK HR VOL:    |         | 74                  | 786     | 81      | 1       | 75         | 835     | 6       | 7       | 0         | 0       | 52      | 0       | 0         | 0       | 124     | 0       | 2041  |       |
| PEAK HR FACTOR: |         | 0.771               | 0.910   | 0.810   | 0.250   | 0.750      | 0.920   | 0.750   | 0.438   | 0.000     | 0.000   | 0.813   | 0.000   | 0.000     | 0.000   | 0.886   | 0.000   | 0.966 |       |
|                 |         | 0.927               |         |         |         | 0.908      |         |         |         | 0.813     |         |         |         | 0.886     |         |         |         |       |       |

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** S 11th Ave & W 5th St  
**City:** Hanford  
**Control:** Signalized

**Project ID:** 20-090149-009  
**Date:** 10/1/2020

### Total

| NS/EW Streets:   |         | S 11th Ave          |         |         |         | S 11th Ave |         |         |         | W 5th St  |         |         |         | W 5th St  |         |         |         |       |       |   |      |
|------------------|---------|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|-------|---|------|
| AM               |         | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         |       |       |   |      |
|                  |         | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 1<br>EL   | 0<br>ET | 1<br>ER | 0<br>EU | 0<br>WL   | 1<br>WT | 0<br>WR | 0<br>WU |       |       |   |      |
|                  | 7:00 AM | 5                   | 74      | 0       | 0       | 0          | 84      | 8       | 0       | 3         | 0       | 1       | 0       | 0         | 0       | 0       | 0       | 175   |       |   |      |
|                  | 7:15 AM | 5                   | 105     | 3       | 0       | 2          | 97      | 11      | 0       | 2         | 0       | 1       | 0       | 0         | 0       | 0       | 0       | 226   |       |   |      |
|                  | 7:30 AM | 4                   | 146     | 5       | 0       | 1          | 113     | 2       | 0       | 3         | 0       | 3       | 0       | 1         | 0       | 0       | 0       | 278   |       |   |      |
|                  | 7:45 AM | 3                   | 220     | 6       | 0       | 0          | 103     | 8       | 0       | 3         | 0       | 0       | 0       | 1         | 0       | 0       | 0       | 344   |       |   |      |
|                  | 8:00 AM | 9                   | 179     | 4       | 0       | 0          | 95      | 8       | 0       | 4         | 0       | 1       | 0       | 1         | 0       | 2       | 0       | 303   |       |   |      |
|                  | 8:15 AM | 4                   | 145     | 3       | 0       | 0          | 76      | 18      | 0       | 6         | 0       | 1       | 0       | 0         | 0       | 2       | 0       | 255   |       |   |      |
|                  | 8:30 AM | 7                   | 143     | 0       | 0       | 1          | 96      | 5       | 0       | 7         | 0       | 1       | 0       | 2         | 0       | 1       | 0       | 263   |       |   |      |
|                  | 8:45 AM | 11                  | 179     | 2       | 0       | 2          | 102     | 8       | 0       | 8         | 0       | 2       | 0       | 1         | 1       | 1       | 0       | 317   |       |   |      |
| TOTAL VOLUMES :  |         | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |       |   |      |
| APPROACH %'s :   |         | 48                  | 1191    | 23      | 0       | 6          | 766     | 68      | 0       | 36        | 0       | 10      | 0       | 6         | 1       | 6       | 0       | 2161  |       |   |      |
|                  |         | 3.80%               | 94.37%  | 1.82%   | 0.00%   | 0.71%      | 91.19%  | 8.10%   | 0.00%   | 78.26%    | 0.00%   | 21.74%  | 0.00%   | 46.15%    | 7.69%   | 46.15%  | 0.00%   |       |       |   |      |
| PEAK HR :        |         | 07:30 AM - 08:30 AM |         |         |         |            |         |         |         |           |         |         |         |           |         |         |         |       | TOTAL |   |      |
| PEAK HR VOL :    |         | 20                  | 690     | 18      | 0       | 1          |         |         |         | 387       | 36      | 0       | 16      | 0         | 5       | 0       | 3       | 0     | 4     | 0 | 1180 |
| PEAK HR FACTOR : |         | 0.556               | 0.784   | 0.750   | 0.000   | 0.250      | 0.856   | 0.500   | 0.000   | 0.667     | 0.000   | 0.417   | 0.000   | 0.750     | 0.000   | 0.500   | 0.000   | 0.858 |       |   |      |
|                  |         | 0.795               |         |         |         | 0.914      |         |         |         | 0.750     |         |         |         | 0.583     |         |         |         |       |       |   |      |

| PM               |         | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         |       |       |
|------------------|---------|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|-------|
|                  |         | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 1<br>EL   | 0<br>ET | 1<br>ER | 0<br>EU | 0<br>WL   | 1<br>WT | 0<br>WR | 0<br>WU |       |       |
|                  | 4:00 PM | 25                  | 204     | 2       | 0       | 1          | 208     | 28      | 1       | 31        | 0       | 6       | 0       | 1         | 0       | 2       | 0       | 509   |       |
|                  | 4:15 PM | 28                  | 210     | 1       | 1       | 1          | 166     | 26      | 3       | 36        | 0       | 10      | 0       | 2         | 0       | 3       | 0       | 487   |       |
|                  | 4:30 PM | 26                  | 214     | 0       | 0       | 0          | 210     | 19      | 2       | 28        | 0       | 8       | 0       | 6         | 0       | 0       | 0       | 513   |       |
|                  | 4:45 PM | 35                  | 205     | 0       | 1       | 0          | 186     | 24      | 0       | 13        | 0       | 7       | 0       | 0         | 0       | 1       | 0       | 472   |       |
|                  | 5:00 PM | 31                  | 195     | 1       | 2       | 0          | 217     | 25      | 0       | 29        | 0       | 8       | 0       | 0         | 0       | 4       | 0       | 512   |       |
|                  | 5:15 PM | 19                  | 178     | 0       | 0       | 1          | 208     | 20      | 0       | 18        | 0       | 9       | 0       | 3         | 0       | 0       | 0       | 456   |       |
|                  | 5:30 PM | 29                  | 168     | 0       | 1       | 0          | 189     | 19      | 1       | 24        | 0       | 14      | 0       | 3         | 0       | 1       | 0       | 449   |       |
|                  | 5:45 PM | 26                  | 172     | 0       | 0       | 0          | 153     | 12      | 0       | 16        | 0       | 7       | 0       | 1         | 0       | 1       | 0       | 388   |       |
| TOTAL VOLUMES :  |         | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |       |
| APPROACH %'s :   |         | 219                 | 1546    | 4       | 5       | 3          | 1537    | 173     | 7       | 195       | 0       | 69      | 0       | 16        | 0       | 12      | 0       | 3786  |       |
|                  |         | 12.34%              | 87.15%  | 0.23%   | 0.28%   | 0.17%      | 89.36%  | 10.06%  | 0.41%   | 73.86%    | 0.00%   | 26.14%  | 0.00%   | 57.14%    | 0.00%   | 42.86%  | 0.00%   |       |       |
| PEAK HR :        |         | 04:15 PM - 05:15 PM |         |         |         |            |         |         |         |           |         |         |         |           |         |         |         |       | TOTAL |
| PEAK HR VOL :    |         | 120                 | 824     | 2       | 4       | 1          | 779     | 94      | 5       | 106       | 0       | 33      | 0       | 8         | 0       | 8       | 0       | 1984  |       |
| PEAK HR FACTOR : |         | 0.857               | 0.963   | 0.500   | 0.500   | 0.250      | 0.897   | 0.904   | 0.417   | 0.736     | 0.000   | 0.825   | 0.000   | 0.333     | 0.000   | 0.500   | 0.000   | 0.967 |       |
|                  |         | 0.985               |         |         |         | 0.908      |         |         |         | 0.755     |         |         |         | 0.667     |         |         |         |       |       |



## National Data &amp; Surveying Services

## Intersection Turning Movement Count

Location: S 11th Ave &amp; SR 198 WB On Ramp/W 4th St

City: Hanford

Control: Signalized

Project ID: 20-090149-008

Date: 10/1/2020

## Total

| NS/EW Streets:   | S 11th Ave          |         |         |         | S 11th Ave |         |         |         | SR 198 WB On Ramp/W 4th St |         |         |         | SR 198 WB On Ramp/W 4th St |         |         |         |       |
|------------------|---------------------|---------|---------|---------|------------|---------|---------|---------|----------------------------|---------|---------|---------|----------------------------|---------|---------|---------|-------|
| AM               | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND                  |         |         |         | WESTBOUND                  |         |         |         | TOTAL |
|                  | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 0<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 0<br>EL                    | 0<br>ET | 0<br>ER | 0<br>EU | 1<br>WL                    | 1<br>WT | 1<br>WR | 0<br>WU |       |
| 7:00 AM          | 13                  | 68      | 0       | 0       | 0          | 56      | 34      | 0       | 0                          | 0       | 0       | 0       | 13                         | 5       | 14      | 0       | 203   |
| 7:15 AM          | 5                   | 82      | 0       | 1       | 0          | 64      | 33      | 0       | 0                          | 0       | 0       | 0       | 30                         | 1       | 27      | 0       | 243   |
| 7:30 AM          | 13                  | 109     | 0       | 0       | 0          | 83      | 43      | 0       | 0                          | 0       | 0       | 0       | 18                         | 1       | 51      | 0       | 318   |
| 7:45 AM          | 10                  | 173     | 0       | 0       | 0          | 77      | 21      | 0       | 0                          | 0       | 0       | 0       | 39                         | 1       | 55      | 0       | 376   |
| 8:00 AM          | 7                   | 151     | 0       | 1       | 0          | 76      | 33      | 0       | 0                          | 0       | 0       | 0       | 23                         | 2       | 38      | 0       | 331   |
| 8:15 AM          | 9                   | 133     | 0       | 0       | 0          | 57      | 28      | 0       | 0                          | 0       | 0       | 0       | 11                         | 8       | 24      | 0       | 270   |
| 8:30 AM          | 6                   | 125     | 0       | 0       | 0          | 80      | 22      | 0       | 0                          | 0       | 0       | 0       | 18                         | 9       | 23      | 0       | 283   |
| 8:45 AM          | 4                   | 161     | 0       | 0       | 0          | 84      | 26      | 0       | 0                          | 0       | 0       | 0       | 28                         | 3       | 32      | 0       | 338   |
| TOTAL VOLUMES :  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL                         | ET      | ER      | EU      | WL                         | WT      | WR      | WU      | TOTAL |
| APPROACH %'s :   | 67                  | 1002    | 0       | 2       | 0          | 577     | 240     | 0       | 0                          | 0       | 0       | 0       | 180                        | 30      | 264     | 0       | 2362  |
|                  | 6.26%               | 93.56%  | 0.00%   | 0.19%   | 0.00%      | 70.62%  | 29.38%  | 0.00%   |                            |         |         |         | 37.97%                     | 6.33%   | 55.70%  | 0.00%   |       |
| PEAK HR :        | 07:30 AM - 08:30 AM |         |         |         |            |         |         |         |                            |         |         |         |                            |         |         |         | TOTAL |
| PEAK HR VOL :    | 39                  | 566     | 0       | 1       | 0          | 293     | 125     | 0       | 0                          | 0       | 0       | 0       | 91                         | 12      | 168     | 0       | 1295  |
| PEAK HR FACTOR : | 0.750               | 0.818   | 0.000   | 0.250   | 0.000      | 0.883   | 0.727   | 0.000   | 0.000                      | 0.000   | 0.000   | 0.000   | 0.583                      | 0.375   | 0.764   | 0.000   | 0.861 |
|                  |                     |         | 0.828   |         |            |         | 0.829   |         |                            |         |         |         |                            |         | 0.713   |         |       |
| PM               | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND                  |         |         |         | WESTBOUND                  |         |         |         | TOTAL |
|                  | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 0<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 0<br>EL                    | 0<br>ET | 0<br>ER | 0<br>EU | 1<br>WL                    | 1<br>WT | 1<br>WR | 0<br>WU |       |
| 4:00 PM          | 10                  | 198     | 0       | 0       | 0          | 163     | 58      | 0       | 0                          | 0       | 0       | 0       | 45                         | 8       | 36      | 0       | 518   |
| 4:15 PM          | 14                  | 195     | 0       | 0       | 0          | 154     | 37      | 0       | 0                          | 0       | 0       | 0       | 53                         | 8       | 43      | 0       | 504   |
| 4:30 PM          | 17                  | 203     | 0       | 0       | 0          | 171     | 63      | 0       | 0                          | 0       | 0       | 0       | 40                         | 5       | 33      | 0       | 532   |
| 4:45 PM          | 15                  | 202     | 0       | 0       | 0          | 156     | 55      | 0       | 0                          | 0       | 0       | 0       | 34                         | 9       | 38      | 0       | 509   |
| 5:00 PM          | 23                  | 194     | 0       | 1       | 0          | 191     | 58      | 0       | 0                          | 0       | 0       | 0       | 41                         | 5       | 37      | 0       | 550   |
| 5:15 PM          | 10                  | 171     | 0       | 0       | 0          | 187     | 50      | 0       | 0                          | 0       | 0       | 0       | 44                         | 11      | 28      | 0       | 501   |
| 5:30 PM          | 15                  | 163     | 0       | 0       | 0          | 156     | 38      | 0       | 0                          | 0       | 0       | 0       | 43                         | 8       | 33      | 0       | 456   |
| 5:45 PM          | 12                  | 169     | 0       | 0       | 0          | 127     | 40      | 0       | 0                          | 0       | 0       | 0       | 44                         | 5       | 33      | 0       | 430   |
| TOTAL VOLUMES :  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL                         | ET      | ER      | EU      | WL                         | WT      | WR      | WU      | TOTAL |
| APPROACH %'s :   | 116                 | 1495    | 0       | 1       | 0          | 1305    | 399     | 0       | 0                          | 0       | 0       | 0       | 344                        | 59      | 281     | 0       | 4000  |
|                  | 7.20%               | 92.74%  | 0.00%   | 0.06%   | 0.00%      | 76.58%  | 23.42%  | 0.00%   |                            |         |         |         | 50.29%                     | 8.63%   | 41.08%  | 0.00%   |       |
| PEAK HR :        | 04:15 PM - 05:15 PM |         |         |         |            |         |         |         |                            |         |         |         |                            |         |         |         | TOTAL |
| PEAK HR VOL :    | 69                  | 794     | 0       | 1       | 0          | 672     | 213     | 0       | 0                          | 0       | 0       | 0       | 168                        | 27      | 151     | 0       | 2095  |
| PEAK HR FACTOR : | 0.750               | 0.978   | 0.000   | 0.250   | 0.000      | 0.880   | 0.845   | 0.000   | 0.000                      | 0.000   | 0.000   | 0.000   | 0.792                      | 0.750   | 0.878   | 0.000   | 0.952 |
|                  |                     |         | 0.982   |         |            |         | 0.889   |         |                            |         |         |         |                            |         | 0.832   |         |       |

## National Data &amp; Surveying Services

## Intersection Turning Movement Count

Location: S 11th Ave &amp; SR 198 EB Off Ramp/W 3rd St

City: Hanford

Control: Signalized

Project ID: 20-090149-007

Date: 10/1/2020

## Total

| NS/EW Streets:   |  | S 11th Ave          |         |         |         | S 11th Ave |         |         |         | SR 198 EB Off Ramp/W 3rd St |         |         |         | SR 198 EB Off Ramp/W 3rd St |         |         |         |       |
|------------------|--|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------------------------|---------|---------|---------|-----------------------------|---------|---------|---------|-------|
| AM               |  | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND                   |         |         |         | WESTBOUND                   |         |         |         | TOTAL |
|                  |  | 0<br>NL             | 2<br>NT | 1<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 0<br>SR | 0<br>SU | 0<br>EL                     | 1<br>ET | 1<br>ER | 0<br>EU | 0<br>WL                     | 0<br>WT | 0<br>WR | 0<br>WU |       |
| 7:00 AM          |  | 0                   | 59      | 24      | 0       | 14         | 51      | 0       | 0       | 23                          | 14      | 3       | 0       | 0                           | 0       | 0       | 0       | 188   |
| 7:15 AM          |  | 0                   | 59      | 23      | 0       | 12         | 86      | 0       | 0       | 25                          | 21      | 6       | 0       | 0                           | 0       | 0       | 0       | 232   |
| 7:30 AM          |  | 0                   | 85      | 28      | 0       | 15         | 83      | 0       | 1       | 37                          | 26      | 14      | 0       | 0                           | 0       | 0       | 0       | 289   |
| 7:45 AM          |  | 0                   | 131     | 32      | 0       | 19         | 100     | 0       | 0       | 57                          | 38      | 22      | 0       | 0                           | 0       | 0       | 0       | 399   |
| 8:00 AM          |  | 0                   | 104     | 23      | 0       | 12         | 83      | 0       | 0       | 50                          | 22      | 16      | 0       | 0                           | 0       | 0       | 0       | 310   |
| 8:15 AM          |  | 0                   | 102     | 20      | 0       | 16         | 57      | 0       | 0       | 41                          | 22      | 13      | 0       | 0                           | 0       | 0       | 0       | 271   |
| 8:30 AM          |  | 0                   | 84      | 27      | 0       | 22         | 76      | 0       | 0       | 46                          | 18      | 11      | 0       | 0                           | 0       | 0       | 0       | 284   |
| 8:45 AM          |  | 0                   | 109     | 30      | 0       | 26         | 84      | 0       | 0       | 60                          | 22      | 11      | 0       | 0                           | 0       | 0       | 0       | 342   |
| TOTAL VOLUMES:   |  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL                          | ET      | ER      | EU      | WL                          | WT      | WR      | WU      | TOTAL |
| APPROACH %'s:    |  | 0                   | 733     | 207     | 0       | 136        | 620     | 0       | 1       | 339                         | 183     | 96      | 0       | 0                           | 0       | 0       | 0       | 2315  |
|                  |  | 0.00%               | 77.98%  | 22.02%  | 0.00%   | 17.97%     | 81.90%  | 0.00%   | 0.13%   | 54.85%                      | 29.61%  | 15.53%  | 0.00%   |                             |         |         |         |       |
| PEAK HR :        |  | 07:30 AM - 08:30 AM |         |         |         |            |         |         |         |                             |         |         |         |                             |         |         |         | TOTAL |
| PEAK HR VOL :    |  | 0                   | 422     | 103     | 0       | 62         | 323     | 0       | 1       | 185                         | 108     | 65      | 0       | 0                           | 0       | 0       | 0       | 1269  |
| PEAK HR FACTOR : |  | 0.000               | 0.805   | 0.805   | 0.000   | 0.816      | 0.808   | 0.000   | 0.250   | 0.811                       | 0.711   | 0.739   | 0.000   | 0.000                       | 0.000   | 0.000   | 0.000   | 0.795 |
|                  |  | 0.805               |         |         |         | 0.811      |         |         |         | 0.765                       |         |         |         |                             |         |         |         |       |

| PM               |  | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         | TOTAL |
|------------------|--|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|
|                  |  | 0<br>NL             | 2<br>NT | 1<br>NR | 0<br>NU | 1<br>SL    | 2<br>ST | 0<br>SR | 0<br>SU | 0<br>EL   | 1<br>ET | 1<br>ER | 0<br>EU | 0<br>WL   | 0<br>WT | 0<br>WR | 0<br>WU |       |
| 4:00 PM          |  | 0                   | 146     | 45      | 0       | 42         | 163     | 0       | 0       | 59        | 8       | 18      | 0       | 0         | 0       | 0       | 0       | 481   |
| 4:15 PM          |  | 0                   | 133     | 38      | 0       | 47         | 163     | 0       | 0       | 79        | 23      | 19      | 0       | 0         | 0       | 0       | 0       | 502   |
| 4:30 PM          |  | 0                   | 152     | 35      | 0       | 57         | 153     | 0       | 1       | 65        | 17      | 16      | 0       | 0         | 0       | 0       | 0       | 496   |
| 4:45 PM          |  | 0                   | 148     | 42      | 0       | 47         | 141     | 0       | 0       | 68        | 12      | 13      | 0       | 0         | 0       | 0       | 0       | 471   |
| 5:00 PM          |  | 0                   | 148     | 41      | 0       | 65         | 170     | 0       | 0       | 72        | 9       | 10      | 0       | 0         | 0       | 0       | 0       | 515   |
| 5:15 PM          |  | 0                   | 118     | 37      | 0       | 46         | 184     | 0       | 0       | 61        | 16      | 16      | 0       | 0         | 0       | 0       | 0       | 478   |
| 5:30 PM          |  | 0                   | 126     | 33      | 0       | 39         | 160     | 0       | 1       | 53        | 8       | 9       | 0       | 0         | 0       | 0       | 0       | 429   |
| 5:45 PM          |  | 0                   | 131     | 25      | 0       | 24         | 144     | 0       | 0       | 53        | 8       | 10      | 0       | 0         | 0       | 0       | 0       | 395   |
| TOTAL VOLUMES:   |  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |
| APPROACH %'s:    |  | 0                   | 1102    | 296     | 0       | 367        | 1278    | 0       | 2       | 510       | 101     | 111     | 0       | 0         | 0       | 0       | 0       | 3767  |
|                  |  | 0.00%               | 78.83%  | 21.17%  | 0.00%   | 22.28%     | 77.60%  | 0.00%   | 0.12%   | 70.64%    | 13.99%  | 15.37%  | 0.00%   |           |         |         |         |       |
| PEAK HR :        |  | 04:15 PM - 05:15 PM |         |         |         |            |         |         |         |           |         |         |         |           |         |         |         | TOTAL |
| PEAK HR VOL :    |  | 0                   | 581     | 156     | 0       | 216        | 627     | 0       | 1       | 284       | 61      | 58      | 0       | 0         | 0       | 0       | 0       | 1984  |
| PEAK HR FACTOR : |  | 0.000               | 0.956   | 0.929   | 0.000   | 0.831      | 0.922   | 0.000   | 0.250   | 0.899     | 0.663   | 0.763   | 0.000   | 0.000     | 0.000   | 0.000   | 0.000   | 0.963 |
|                  |  | 0.970               |         |         |         | 0.898      |         |         |         | 0.833     |         |         |         |           |         |         |         |       |

## National Data &amp; Surveying Services

## Intersection Turning Movement Count

Location: 12th Ave &amp; SR 198 EB Off/On Ramps

City: Hanford

Control: Signalized

Project ID: 20-090149-006

Date: 10/1/2020

## Total

| NS/EW Streets:  |  | 12th Ave            |         |         |         | 12th Ave   |         |         |         | SR 198 EB Off/On Ramps |         |         |         | SR 198 EB Off/On Ramps |         |         |         |       |
|-----------------|--|---------------------|---------|---------|---------|------------|---------|---------|---------|------------------------|---------|---------|---------|------------------------|---------|---------|---------|-------|
| AM              |  | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND              |         |         |         | WESTBOUND              |         |         |         | TOTAL |
|                 |  | 0<br>NL             | 2<br>NT | 1<br>NR | 0<br>NU | 0<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 2<br>EL                | 0<br>ET | 1<br>ER | 0<br>EU | 0<br>WL                | 0<br>WT | 0<br>WR | 0<br>WU |       |
| 7:00 AM         |  | 0                   | 54      | 23      | 0       | 0          | 39      | 34      | 0       | 28                     | 0       | 3       | 0       | 0                      | 0       | 0       | 0       | 181   |
| 7:15 AM         |  | 0                   | 84      | 16      | 0       | 0          | 57      | 51      | 0       | 62                     | 0       | 2       | 0       | 0                      | 0       | 0       | 0       | 272   |
| 7:30 AM         |  | 0                   | 81      | 26      | 0       | 0          | 75      | 61      | 0       | 54                     | 0       | 5       | 0       | 0                      | 0       | 0       | 0       | 302   |
| 7:45 AM         |  | 0                   | 100     | 27      | 0       | 0          | 53      | 35      | 0       | 106                    | 0       | 2       | 0       | 0                      | 0       | 0       | 0       | 323   |
| 8:00 AM         |  | 0                   | 88      | 17      | 0       | 0          | 53      | 44      | 0       | 56                     | 0       | 0       | 0       | 0                      | 0       | 0       | 0       | 258   |
| 8:15 AM         |  | 0                   | 66      | 24      | 0       | 0          | 68      | 42      | 0       | 79                     | 0       | 5       | 0       | 0                      | 0       | 0       | 0       | 284   |
| 8:30 AM         |  | 0                   | 77      | 9       | 0       | 0          | 47      | 39      | 0       | 59                     | 0       | 4       | 0       | 0                      | 0       | 0       | 0       | 235   |
| 8:45 AM         |  | 0                   | 81      | 22      | 0       | 0          | 60      | 37      | 0       | 63                     | 0       | 1       | 0       | 0                      | 0       | 0       | 0       | 264   |
| TOTAL VOLUMES:  |  | 0                   | 631     | 164     | 0       | 0          | 452     | 343     | 0       | 507                    | 0       | 22      | 0       | 0                      | 0       | 0       | 0       | 2119  |
| APPROACH %'s:   |  | 0.00%               | 79.37%  | 20.63%  | 0.00%   | 0.00%      | 56.86%  | 43.14%  | 0.00%   | 95.84%                 | 0.00%   | 4.16%   | 0.00%   |                        |         |         |         |       |
| PEAK HR:        |  | 07:30 AM - 08:30 AM |         |         |         |            |         |         |         |                        |         |         |         |                        |         |         |         | TOTAL |
| PEAK HR VOL:    |  | 0                   | 335     | 94      | 0       | 0          | 249     | 182     | 0       | 295                    | 0       | 12      | 0       | 0                      | 0       | 0       | 0       | 1167  |
| PEAK HR FACTOR: |  | 0.000               | 0.838   | 0.870   | 0.000   | 0.000      | 0.830   | 0.746   | 0.000   | 0.696                  | 0.000   | 0.600   | 0.000   | 0.000                  | 0.000   | 0.000   | 0.000   | 0.903 |
|                 |  | 0.844               |         |         |         | 0.792      |         |         |         | 0.711                  |         |         |         |                        |         |         |         |       |

| PM              |  | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         | TOTAL |
|-----------------|--|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|
|                 |  | 0<br>NL             | 2<br>NT | 1<br>NR | 0<br>NU | 0<br>SL    | 2<br>ST | 1<br>SR | 0<br>SU | 2<br>EL   | 0<br>ET | 1<br>ER | 0<br>EU | 0<br>WL   | 0<br>WT | 0<br>WR | 0<br>WU |       |
| 4:00 PM         |  | 0                   | 119     | 29      | 0       | 0          | 156     | 101     | 0       | 130       | 0       | 7       | 0       | 0         | 0       | 0       | 0       | 542   |
| 4:15 PM         |  | 0                   | 121     | 28      | 0       | 0          | 147     | 87      | 0       | 123       | 0       | 10      | 0       | 0         | 0       | 0       | 0       | 516   |
| 4:30 PM         |  | 0                   | 114     | 34      | 0       | 0          | 145     | 107     | 0       | 109       | 0       | 7       | 0       | 0         | 0       | 0       | 0       | 516   |
| 4:45 PM         |  | 0                   | 130     | 30      | 0       | 0          | 152     | 76      | 0       | 115       | 0       | 14      | 0       | 0         | 0       | 0       | 0       | 517   |
| 5:00 PM         |  | 0                   | 133     | 23      | 0       | 0          | 184     | 138     | 0       | 104       | 0       | 10      | 0       | 0         | 0       | 0       | 0       | 592   |
| 5:15 PM         |  | 0                   | 131     | 23      | 0       | 0          | 197     | 105     | 0       | 111       | 0       | 7       | 0       | 0         | 0       | 0       | 0       | 574   |
| 5:30 PM         |  | 0                   | 128     | 26      | 0       | 0          | 168     | 81      | 0       | 100       | 0       | 10      | 0       | 0         | 0       | 0       | 0       | 513   |
| 5:45 PM         |  | 0                   | 119     | 21      | 0       | 0          | 155     | 79      | 0       | 87        | 0       | 3       | 0       | 0         | 0       | 0       | 0       | 464   |
| TOTAL VOLUMES:  |  | 0                   | 995     | 214     | 0       | 0          | 1304    | 774     | 0       | 879       | 0       | 68      | 0       | 0         | 0       | 0       | 0       | 4234  |
| APPROACH %'s:   |  | 0.00%               | 82.30%  | 17.70%  | 0.00%   | 0.00%      | 62.75%  | 37.25%  | 0.00%   | 92.82%    | 0.00%   | 7.18%   | 0.00%   |           |         |         |         |       |
| PEAK HR:        |  | 04:30 PM - 05:30 PM |         |         |         |            |         |         |         |           |         |         |         |           |         |         |         | TOTAL |
| PEAK HR VOL:    |  | 0                   | 508     | 110     | 0       | 0          | 678     | 426     | 0       | 439       | 0       | 38      | 0       | 0         | 0       | 0       | 0       | 2199  |
| PEAK HR FACTOR: |  | 0.000               | 0.955   | 0.809   | 0.000   | 0.000      | 0.860   | 0.772   | 0.000   | 0.954     | 0.000   | 0.679   | 0.000   | 0.000     | 0.000   | 0.000   | 0.000   | 0.929 |
|                 |  | 0.966               |         |         |         | 0.857      |         |         |         | 0.924     |         |         |         |           |         |         |         |       |

## National Data &amp; Surveying Services

## Intersection Turning Movement Count

Location: 12th Ave &amp; SR 198 WB On/Off Ramps

City: Hanford

Control: Signalized

Project ID: 20-090149-005

Date: 10/1/2020

## Total

| NS/EW Streets:   | 12th Ave            |         |         |         | 12th Ave   |         |         |         | SR 198 WB On/Off Ramps |         |         |         | SR 198 WB On/Off Ramps |         |           |         |       |
|------------------|---------------------|---------|---------|---------|------------|---------|---------|---------|------------------------|---------|---------|---------|------------------------|---------|-----------|---------|-------|
| AM               | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND              |         |         |         | WESTBOUND              |         |           |         | TOTAL |
|                  | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 0<br>SL    | 3<br>ST | 1<br>SR | 0<br>SU | 0<br>EL                | 0<br>ET | 0<br>ER | 0<br>EU | 1.5<br>WL              | 0<br>WT | 1.5<br>WR | 0<br>WU |       |
| 7:00 AM          | 8                   | 76      | 0       | 0       | 0          | 65      | 58      | 0       | 0                      | 0       | 0       | 0       | 7                      | 0       | 60        | 0       | 274   |
| 7:15 AM          | 12                  | 134     | 0       | 0       | 0          | 101     | 48      | 0       | 0                      | 0       | 0       | 0       | 8                      | 0       | 72        | 0       | 375   |
| 7:30 AM          | 12                  | 123     | 0       | 0       | 0          | 123     | 59      | 0       | 0                      | 0       | 0       | 0       | 12                     | 0       | 100       | 0       | 429   |
| 7:45 AM          | 6                   | 197     | 0       | 0       | 0          | 78      | 55      | 0       | 0                      | 0       | 0       | 0       | 10                     | 0       | 109       | 0       | 455   |
| 8:00 AM          | 9                   | 138     | 0       | 0       | 0          | 96      | 59      | 0       | 0                      | 0       | 0       | 0       | 5                      | 0       | 77        | 0       | 384   |
| 8:15 AM          | 6                   | 139     | 0       | 0       | 0          | 95      | 46      | 0       | 0                      | 0       | 0       | 0       | 12                     | 0       | 49        | 0       | 347   |
| 8:30 AM          | 3                   | 131     | 0       | 0       | 0          | 85      | 42      | 0       | 0                      | 0       | 0       | 0       | 11                     | 0       | 65        | 0       | 337   |
| 8:45 AM          | 7                   | 139     | 0       | 0       | 0          | 78      | 36      | 0       | 0                      | 0       | 0       | 0       | 8                      | 0       | 77        | 0       | 345   |
| TOTAL VOLUMES :  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL                     | ET      | ER      | EU      | WL                     | WT      | WR        | WU      | TOTAL |
| APPROACH %'s :   | 63                  | 1077    | 0       | 0       | 0          | 721     | 403     | 0       | 0                      | 0       | 0       | 0       | 73                     | 0       | 609       | 0       | 2946  |
|                  | 5.53%               | 94.47%  | 0.00%   | 0.00%   | 0.00%      | 64.15%  | 35.85%  | 0.00%   |                        |         |         |         | 10.70%                 | 0.00%   | 89.30%    | 0.00%   |       |
| PEAK HR :        | 07:15 AM - 08:15 AM |         |         |         |            |         |         |         |                        |         |         |         |                        |         |           |         | TOTAL |
| PEAK HR VOL :    | 39                  | 592     | 0       | 0       | 0          | 398     | 221     | 0       | 0                      | 0       | 0       | 0       | 35                     | 0       | 358       | 0       | 1643  |
| PEAK HR FACTOR : | 0.813               | 0.751   | 0.000   | 0.000   | 0.000      | 0.809   | 0.936   | 0.000   | 0.000                  | 0.000   | 0.000   | 0.000   | 0.729                  | 0.000   | 0.821     | 0.000   | 0.903 |
|                  |                     | 0.777   |         |         |            | 0.850   |         |         |                        |         |         |         |                        | 0.826   |           |         |       |
| PM               | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND              |         |         |         | WESTBOUND              |         |           |         | TOTAL |
|                  | 1<br>NL             | 2<br>NT | 0<br>NR | 0<br>NU | 0<br>SL    | 3<br>ST | 1<br>SR | 0<br>SU | 0<br>EL                | 0<br>ET | 0<br>ER | 0<br>EU | 1.5<br>WL              | 0<br>WT | 1.5<br>WR | 0<br>WU |       |
| 4:00 PM          | 5                   | 244     | 0       | 0       | 0          | 232     | 126     | 0       | 0                      | 0       | 0       | 0       | 29                     | 0       | 88        | 0       | 724   |
| 4:15 PM          | 5                   | 232     | 0       | 0       | 0          | 202     | 113     | 0       | 0                      | 0       | 0       | 0       | 30                     | 0       | 80        | 0       | 662   |
| 4:30 PM          | 6                   | 222     | 0       | 0       | 0          | 223     | 124     | 0       | 0                      | 0       | 0       | 0       | 31                     | 0       | 94        | 0       | 700   |
| 4:45 PM          | 9                   | 238     | 0       | 0       | 0          | 196     | 118     | 0       | 0                      | 0       | 0       | 0       | 29                     | 0       | 98        | 0       | 688   |
| 5:00 PM          | 10                  | 227     | 0       | 0       | 0          | 309     | 130     | 0       | 0                      | 0       | 0       | 0       | 18                     | 1       | 110       | 0       | 805   |
| 5:15 PM          | 9                   | 231     | 0       | 0       | 0          | 249     | 134     | 0       | 0                      | 0       | 0       | 0       | 46                     | 0       | 97        | 0       | 766   |
| 5:30 PM          | 7                   | 223     | 0       | 0       | 0          | 233     | 123     | 0       | 0                      | 0       | 0       | 0       | 17                     | 0       | 110       | 0       | 713   |
| 5:45 PM          | 11                  | 192     | 0       | 0       | 0          | 209     | 132     | 0       | 0                      | 0       | 0       | 0       | 27                     | 0       | 100       | 0       | 671   |
| TOTAL VOLUMES :  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL                     | ET      | ER      | EU      | WL                     | WT      | WR        | WU      | TOTAL |
| APPROACH %'s :   | 62                  | 1809    | 0       | 0       | 0          | 1853    | 1000    | 0       | 0                      | 0       | 0       | 0       | 227                    | 1       | 777       | 0       | 5729  |
|                  | 3.31%               | 96.69%  | 0.00%   | 0.00%   | 0.00%      | 64.95%  | 35.05%  | 0.00%   |                        |         |         |         | 22.59%                 | 0.10%   | 77.31%    | 0.00%   |       |
| PEAK HR :        | 04:45 PM - 05:45 PM |         |         |         |            |         |         |         |                        |         |         |         |                        |         |           |         | TOTAL |
| PEAK HR VOL :    | 35                  | 919     | 0       | 0       | 0          | 987     | 505     | 0       | 0                      | 0       | 0       | 0       | 110                    | 1       | 415       | 0       | 2972  |
| PEAK HR FACTOR : | 0.875               | 0.965   | 0.000   | 0.000   | 0.000      | 0.799   | 0.942   | 0.000   | 0.000                  | 0.000   | 0.000   | 0.000   | 0.598                  | 0.250   | 0.943     | 0.000   | 0.923 |
|                  |                     | 0.966   |         |         |            | 0.850   |         |         |                        |         |         |         |                        | 0.920   |           |         |       |

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** 12th Ave & Glendale Ave  
**City:** Hanford  
**Control:** 2-Way Stop (EB/WB)

**Project ID:** 20-090149-004  
**Date:** 10/1/2020

### Total

| NS/EW Streets:          | 12th Ave            |        |       |       | 12th Ave   |        |        |       | Glendale Ave |       |         |       | Glendale Ave |       |         |       |              |
|-------------------------|---------------------|--------|-------|-------|------------|--------|--------|-------|--------------|-------|---------|-------|--------------|-------|---------|-------|--------------|
| AM                      | NORTHBOUND          |        |       |       | SOUTHBOUND |        |        |       | EASTBOUND    |       |         |       | WESTBOUND    |       |         |       | TOTAL        |
|                         | 0                   | 3      | 0     | 0     | 1          | 3      | 0      | 0     | 0            | 0     | 1       | 0     | 0            | 0     | 1       | 0     |              |
|                         | NL                  | NT     | NR    | NU    | SL         | ST     | SR     | SU    | EL           | ET    | ER      | EU    | WL           | WT    | WR      | WU    |              |
| 7:00 AM                 | 0                   | 130    | 7     | 0     | 2          | 116    | 18     | 0     | 0            | 0     | 7       | 0     | 0            | 0     | 10      | 0     | 290          |
| 7:15 AM                 | 0                   | 200    | 6     | 0     | 4          | 133    | 12     | 1     | 0            | 0     | 16      | 0     | 0            | 0     | 4       | 0     | 376          |
| 7:30 AM                 | 0                   | 211    | 9     | 0     | 4          | 171    | 22     | 1     | 0            | 0     | 15      | 0     | 0            | 0     | 9       | 0     | 442          |
| 7:45 AM                 | 0                   | 296    | 12    | 0     | 14         | 126    | 16     | 0     | 0            | 0     | 12      | 0     | 0            | 0     | 11      | 0     | 487          |
| 8:00 AM                 | 0                   | 203    | 10    | 0     | 6          | 136    | 27     | 1     | 0            | 0     | 12      | 0     | 0            | 0     | 8       | 0     | 403          |
| 8:15 AM                 | 0                   | 182    | 8     | 0     | 6          | 136    | 17     | 0     | 0            | 0     | 10      | 0     | 0            | 0     | 12      | 0     | 371          |
| 8:30 AM                 | 0                   | 189    | 8     | 0     | 1          | 111    | 12     | 0     | 0            | 0     | 9       | 0     | 0            | 0     | 10      | 0     | 340          |
| 8:45 AM                 | 0                   | 203    | 13    | 0     | 6          | 106    | 16     | 0     | 0            | 0     | 9       | 0     | 0            | 0     | 12      | 0     | 365          |
| <b>TOTAL VOLUMES :</b>  | NL                  | NT     | NR    | NU    | SL         | ST     | SR     | SU    | EL           | ET    | ER      | EU    | WL           | WT    | WR      | WU    | <b>TOTAL</b> |
| <b>APPROACH %'s :</b>   | 0                   | 1614   | 73    | 0     | 43         | 1035   | 140    | 3     | 0            | 0     | 90      | 0     | 0            | 0     | 76      | 0     | 3074         |
|                         | 0.00%               | 95.67% | 4.33% | 0.00% | 3.52%      | 84.77% | 11.47% | 0.25% | 0.00%        | 0.00% | 100.00% | 0.00% | 0.00%        | 0.00% | 100.00% | 0.00% |              |
| <b>PEAK HR :</b>        | 07:15 AM - 08:15 AM |        |       |       | 28         | 566    | 77     | 3     | 0            | 0     | 55      | 0     | 0            | 0     | 32      | 0     | <b>TOTAL</b> |
| <b>PEAK HR VOL :</b>    | 0                   | 910    | 37    | 0     | 28         | 566    | 77     | 3     | 0            | 0     | 55      | 0     | 0            | 0     | 32      | 0     | 1708         |
| <b>PEAK HR FACTOR :</b> | 0.000               | 0.769  | 0.771 | 0.000 | 0.500      | 0.827  | 0.713  | 0.750 | 0.000        | 0.000 | 0.859   | 0.000 | 0.000        | 0.000 | 0.727   | 0.000 | 0.877        |
|                         |                     | 0.769  |       |       |            | 0.851  |        |       |              |       | 0.859   |       |              |       | 0.727   |       |              |
| PM                      | NORTHBOUND          |        |       |       | SOUTHBOUND |        |        |       | EASTBOUND    |       |         |       | WESTBOUND    |       |         |       | TOTAL        |
|                         | 0                   | 3      | 0     | 0     | 1          | 3      | 0      | 0     | 0            | 0     | 1       | 0     | 0            | 0     | 1       | 0     |              |
|                         | NL                  | NT     | NR    | NU    | SL         | ST     | SR     | SU    | EL           | ET    | ER      | EU    | WL           | WT    | WR      | WU    |              |
| 4:00 PM                 | 0                   | 322    | 8     | 0     | 5          | 319    | 28     | 1     | 0            | 0     | 33      | 0     | 0            | 0     | 10      | 0     | 726          |
| 4:15 PM                 | 0                   | 302    | 12    | 0     | 9          | 302    | 30     | 2     | 0            | 0     | 24      | 0     | 0            | 0     | 15      | 0     | 696          |
| 4:30 PM                 | 0                   | 309    | 7     | 0     | 5          | 311    | 26     | 2     | 0            | 0     | 28      | 0     | 0            | 0     | 19      | 0     | 707          |
| 4:45 PM                 | 0                   | 328    | 8     | 0     | 8          | 295    | 36     | 3     | 0            | 0     | 32      | 0     | 0            | 0     | 22      | 0     | 732          |
| 5:00 PM                 | 0                   | 327    | 5     | 0     | 4          | 393    | 40     | 2     | 0            | 0     | 36      | 0     | 0            | 0     | 20      | 0     | 827          |
| 5:15 PM                 | 0                   | 328    | 5     | 0     | 3          | 357    | 25     | 0     | 0            | 0     | 35      | 0     | 0            | 0     | 14      | 0     | 767          |
| 5:30 PM                 | 0                   | 326    | 4     | 0     | 5          | 316    | 23     | 3     | 0            | 0     | 24      | 0     | 0            | 0     | 19      | 0     | 720          |
| 5:45 PM                 | 0                   | 288    | 7     | 0     | 6          | 315    | 34     | 0     | 0            | 0     | 28      | 0     | 0            | 0     | 11      | 0     | 689          |
| <b>TOTAL VOLUMES :</b>  | NL                  | NT     | NR    | NU    | SL         | ST     | SR     | SU    | EL           | ET    | ER      | EU    | WL           | WT    | WR      | WU    | <b>TOTAL</b> |
| <b>APPROACH %'s :</b>   | 0                   | 2530   | 56    | 0     | 45         | 2608   | 242    | 13    | 0            | 0     | 240     | 0     | 0            | 0     | 130     | 0     | 5864         |
|                         | 0.00%               | 97.83% | 2.17% | 0.00% | 1.55%      | 89.68% | 8.32%  | 0.45% | 0.00%        | 0.00% | 100.00% | 0.00% | 0.00%        | 0.00% | 100.00% | 0.00% |              |
| <b>PEAK HR :</b>        | 04:45 PM - 05:45 PM |        |       |       | 20         | 1361   | 124    | 8     | 0            | 0     | 127     | 0     | 0            | 0     | 75      | 0     | <b>TOTAL</b> |
| <b>PEAK HR VOL :</b>    | 0                   | 1309   | 22    | 0     | 20         | 1361   | 124    | 8     | 0            | 0     | 127     | 0     | 0            | 0     | 75      | 0     | 3046         |
| <b>PEAK HR FACTOR :</b> | 0.000               | 0.998  | 0.688 | 0.000 | 0.625      | 0.866  | 0.775  | 0.667 | 0.000        | 0.000 | 0.882   | 0.000 | 0.000        | 0.000 | 0.852   | 0.000 | 0.921        |
|                         |                     | 0.990  |       |       |            | 0.862  |        |       |              |       | 0.882   |       |              |       | 0.852   |       |              |



# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Campus Dr & W 6th St  
**City:** Hanford  
**Control:** 2-Way Stop (EB/WB)

**Project ID:** 20-090149-003  
**Date:** 10/1/2020

### Total

| NS/EW Streets:          | Campus Dr           |         |         |         | Campus Dr  |         |         |         | W 6th St  |         |         |         | W 6th St  |         |         |         |       |
|-------------------------|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|
| AM                      | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         | TOTAL |
|                         | 0<br>NL             | 1<br>NT | 0<br>NR | 0<br>NU | 0<br>SL    | 1<br>ST | 0<br>SR | 0<br>SU | 0<br>EL   | 1<br>ET | 0<br>ER | 0<br>EU | 0<br>WL   | 1<br>WT | 0<br>WR | 0<br>WU |       |
| 7:00 AM                 | 0                   | 0       | 0       | 0       | 2          | 0       | 2       | 0       | 0         | 0       | 0       | 0       | 0         | 1       | 4       | 0       | 9     |
| 7:15 AM                 | 0                   | 0       | 1       | 0       | 6          | 0       | 0       | 0       | 1         | 1       | 1       | 0       | 0         | 1       | 6       | 0       | 17    |
| 7:30 AM                 | 0                   | 0       | 1       | 0       | 5          | 0       | 8       | 0       | 6         | 6       | 0       | 0       | 0         | 1       | 8       | 0       | 35    |
| 7:45 AM                 | 0                   | 2       | 0       | 0       | 5          | 1       | 8       | 0       | 3         | 3       | 0       | 0       | 0         | 5       | 22      | 0       | 49    |
| 8:00 AM                 | 0                   | 0       | 0       | 0       | 9          | 1       | 2       | 0       | 2         | 0       | 0       | 0       | 0         | 0       | 18      | 0       | 32    |
| 8:15 AM                 | 1                   | 1       | 0       | 0       | 4          | 2       | 1       | 0       | 1         | 1       | 1       | 0       | 0         | 2       | 8       | 0       | 22    |
| 8:30 AM                 | 1                   | 0       | 0       | 0       | 8          | 0       | 1       | 0       | 2         | 0       | 1       | 0       | 0         | 3       | 5       | 0       | 21    |
| 8:45 AM                 | 1                   | 0       | 0       | 0       | 14         | 1       | 2       | 0       | 1         | 0       | 1       | 0       | 0         | 2       | 14      | 0       | 36    |
| <b>TOTAL VOLUMES :</b>  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |
| <b>APPROACH %'s :</b>   | 3                   | 3       | 2       | 0       | 53         | 5       | 24      | 0       | 16        | 11      | 4       | 0       | 0         | 15      | 85      | 0       | 221   |
|                         | 37.50%              | 37.50%  | 25.00%  | 0.00%   | 64.63%     | 6.10%   | 29.27%  | 0.00%   | 51.61%    | 35.48%  | 12.90%  | 0.00%   | 0.00%     | 15.00%  | 85.00%  | 0.00%   |       |
| <b>PEAK HR :</b>        | 07:30 AM - 08:30 AM |         |         |         | 23         | 4       | 19      | 0       | 12        | 10      | 1       | 0       | 0         | 8       | 56      | 0       | TOTAL |
| <b>PEAK HR VOL :</b>    | 1                   | 3       | 1       | 0       | 23         | 4       | 19      | 0       | 12        | 10      | 1       | 0       | 0         | 8       | 56      | 0       | 138   |
| <b>PEAK HR FACTOR :</b> | 0.250               | 0.375   | 0.250   | 0.000   | 0.639      | 0.500   | 0.594   | 0.000   | 0.500     | 0.417   | 0.250   | 0.000   | 0.000     | 0.400   | 0.636   | 0.000   | 0.704 |
|                         |                     |         | 0.625   |         |            |         | 0.821   |         |           |         | 0.479   |         |           |         | 0.593   |         |       |

| PM                      | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         | TOTAL |
|-------------------------|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|
|                         | 0<br>NL             | 1<br>NT | 0<br>NR | 0<br>NU | 0<br>SL    | 1<br>ST | 0<br>SR | 0<br>SU | 0<br>EL   | 1<br>ET | 0<br>ER | 0<br>EU | 0<br>WL   | 1<br>WT | 0<br>WR | 0<br>WU |       |
| 4:00 PM                 | 0                   | 0       | 0       | 0       | 19         | 0       | 1       | 0       | 3         | 2       | 0       | 0       | 0         | 0       | 11      | 0       | 36    |
| 4:15 PM                 | 0                   | 0       | 0       | 0       | 10         | 0       | 3       | 0       | 1         | 2       | 0       | 0       | 0         | 1       | 10      | 0       | 27    |
| 4:30 PM                 | 0                   | 1       | 0       | 0       | 9          | 1       | 1       | 0       | 2         | 1       | 0       | 0       | 0         | 1       | 10      | 0       | 26    |
| 4:45 PM                 | 0                   | 0       | 0       | 0       | 9          | 0       | 6       | 0       | 3         | 1       | 0       | 0       | 0         | 1       | 22      | 0       | 42    |
| 5:00 PM                 | 0                   | 0       | 0       | 0       | 9          | 0       | 1       | 0       | 2         | 2       | 0       | 0       | 0         | 2       | 17      | 0       | 33    |
| 5:15 PM                 | 0                   | 0       | 0       | 0       | 10         | 0       | 2       | 0       | 2         | 1       | 0       | 0       | 0         | 1       | 9       | 0       | 25    |
| 5:30 PM                 | 0                   | 0       | 0       | 0       | 10         | 0       | 1       | 0       | 2         | 3       | 0       | 0       | 0         | 0       | 12      | 0       | 28    |
| 5:45 PM                 | 0                   | 0       | 0       | 0       | 3          | 0       | 2       | 0       | 1         | 0       | 0       | 0       | 0         | 2       | 4       | 0       | 12    |
| <b>TOTAL VOLUMES :</b>  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |
| <b>APPROACH %'s :</b>   | 0                   | 1       | 0       | 0       | 79         | 1       | 17      | 0       | 16        | 12      | 0       | 0       | 0         | 8       | 95      | 0       | 229   |
|                         | 0.00%               | 100.00% | 0.00%   | 0.00%   | 81.44%     | 1.03%   | 17.53%  | 0.00%   | 57.14%    | 42.86%  | 0.00%   | 0.00%   | 0.00%     | 7.77%   | 92.23%  | 0.00%   |       |
| <b>PEAK HR :</b>        | 04:00 PM - 05:00 PM |         |         |         | 47         | 1       | 11      | 0       | 9         | 6       | 0       | 0       | 0         | 3       | 53      | 0       | TOTAL |
| <b>PEAK HR VOL :</b>    | 0                   | 1       | 0       | 0       | 47         | 1       | 11      | 0       | 9         | 6       | 0       | 0       | 0         | 3       | 53      | 0       | 131   |
| <b>PEAK HR FACTOR :</b> | 0.000               | 0.250   | 0.000   | 0.000   | 0.618      | 0.250   | 0.458   | 0.000   | 0.750     | 0.750   | 0.000   | 0.000   | 0.000     | 0.750   | 0.602   | 0.000   | 0.780 |
|                         |                     |         | 0.250   |         |            |         | 0.738   |         |           |         | 0.750   |         |           |         | 0.609   |         |       |

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Campus Dr & W 7th St  
**City:** Hanford  
**Control:** 4-Way Stop

**Project ID:** 20-090149-002  
**Date:** 10/1/2020

### Total

| NS/EW Streets:         | Campus Dr           |          |          |         | Campus Dr  |          |          |         | W 7th St  |           |          |         | W 7th St  |           |          |         |                     |
|------------------------|---------------------|----------|----------|---------|------------|----------|----------|---------|-----------|-----------|----------|---------|-----------|-----------|----------|---------|---------------------|
| AM                     | NORTHBOUND          |          |          |         | SOUTHBOUND |          |          |         | EASTBOUND |           |          |         | WESTBOUND |           |          |         | TOTAL               |
|                        | 0<br>NL             | 1<br>NT  | 0<br>NR  | 0<br>NU | 0<br>SL    | 1<br>ST  | 0<br>SR  | 0<br>SU | 1<br>EL   | 1<br>ET   | 0<br>ER  | 0<br>EU | 1<br>WL   | 1<br>WT   | 0<br>WR  | 0<br>WU |                     |
| 7:00 AM                | 2                   | 2        | 0        | 0       | 1          | 2        | 5        | 0       | 6         | 16        | 2        | 0       | 1         | 18        | 2        | 0       | 57                  |
| 7:15 AM                | 1                   | 5        | 1        | 0       | 3          | 2        | 4        | 0       | 7         | 17        | 1        | 0       | 1         | 23        | 5        | 0       | 70                  |
| 7:30 AM                | 2                   | 8        | 4        | 0       | 3          | 8        | 10       | 0       | 13        | 14        | 3        | 0       | 4         | 32        | 2        | 0       | 103                 |
| 7:45 AM                | 8                   | 16       | 2        | 0       | 4          | 3        | 5        | 0       | 26        | 23        | 6        | 0       | 6         | 32        | 12       | 0       | 143                 |
| 8:00 AM                | 5                   | 14       | 2        | 0       | 1          | 7        | 5        | 0       | 17        | 24        | 2        | 0       | 1         | 19        | 5        | 0       | 102                 |
| 8:15 AM                | 2                   | 5        | 3        | 0       | 9          | 5        | 5        | 0       | 7         | 29        | 1        | 0       | 3         | 28        | 5        | 0       | 102                 |
| 8:30 AM                | 3                   | 4        | 0        | 0       | 6          | 4        | 10       | 0       | 8         | 31        | 7        | 0       | 0         | 26        | 4        | 0       | 103                 |
| 8:45 AM                | 4                   | 7        | 4        | 0       | 8          | 8        | 7        | 0       | 7         | 31        | 5        | 0       | 3         | 36        | 4        | 0       | 124                 |
| <b>TOTAL VOLUMES:</b>  | NL<br>27            | NT<br>61 | NR<br>16 | NU<br>0 | SL<br>35   | ST<br>39 | SR<br>51 | SU<br>0 | EL<br>91  | ET<br>185 | ER<br>27 | EU<br>0 | WL<br>19  | WT<br>214 | WR<br>39 | WU<br>0 | <b>TOTAL</b><br>804 |
| <b>APPROACH %'s:</b>   | 25.96%              | 58.65%   | 15.38%   | 0.00%   | 28.00%     | 31.20%   | 40.80%   | 0.00%   | 30.03%    | 61.06%    | 8.91%    | 0.00%   | 6.99%     | 78.68%    | 14.34%   | 0.00%   |                     |
| <b>PEAK HR:</b>        | 07:30 AM - 08:30 AM |          |          |         | 17         | 23       | 25       | 0       | 63        | 90        | 12       | 0       | 14        | 111       | 24       | 0       | <b>TOTAL</b><br>450 |
| <b>PEAK HR VOL:</b>    | 17                  | 43       | 11       | 0       | 17         | 23       | 25       | 0       | 63        | 90        | 12       | 0       | 14        | 111       | 24       | 0       | 0.787               |
| <b>PEAK HR FACTOR:</b> | 0.531               | 0.672    | 0.688    | 0.000   | 0.472      | 0.719    | 0.625    | 0.000   | 0.606     | 0.776     | 0.500    | 0.000   | 0.583     | 0.867     | 0.500    | 0.000   |                     |
|                        | 0.683               |          |          |         | 0.774      |          |          |         | 0.750     |           |          |         | 0.745     |           |          |         |                     |

| PM                     | NORTHBOUND          |          |         |         | SOUTHBOUND |          |           |         | EASTBOUND |           |          |         | WESTBOUND |           |          |         |                      |
|------------------------|---------------------|----------|---------|---------|------------|----------|-----------|---------|-----------|-----------|----------|---------|-----------|-----------|----------|---------|----------------------|
|                        | 0<br>NL             | 1<br>NT  | 0<br>NR | 0<br>NU | 0<br>SL    | 1<br>ST  | 0<br>SR   | 0<br>SU | 1<br>EL   | 1<br>ET   | 0<br>ER  | 0<br>EU | 1<br>WL   | 1<br>WT   | 0<br>WR  | 0<br>WU | TOTAL                |
| 4:00 PM                | 5                   | 8        | 0       | 0       | 13         | 9        | 10        | 0       | 19        | 53        | 8        | 0       | 3         | 62        | 10       | 0       | 200                  |
| 4:15 PM                | 4                   | 8        | 0       | 0       | 11         | 5        | 14        | 0       | 14        | 53        | 9        | 0       | 0         | 71        | 9        | 0       | 198                  |
| 4:30 PM                | 7                   | 6        | 0       | 0       | 23         | 5        | 16        | 0       | 15        | 49        | 5        | 0       | 1         | 58        | 3        | 0       | 188                  |
| 4:45 PM                | 10                  | 13       | 1       | 0       | 9          | 5        | 11        | 0       | 14        | 53        | 3        | 0       | 6         | 73        | 7        | 0       | 205                  |
| 5:00 PM                | 8                   | 9        | 2       | 0       | 25         | 7        | 26        | 0       | 11        | 49        | 3        | 0       | 0         | 57        | 12       | 0       | 209                  |
| 5:15 PM                | 4                   | 6        | 2       | 0       | 13         | 6        | 9         | 0       | 11        | 34        | 3        | 0       | 3         | 66        | 6        | 0       | 163                  |
| 5:30 PM                | 4                   | 10       | 1       | 0       | 7          | 6        | 9         | 0       | 12        | 47        | 5        | 0       | 2         | 56        | 5        | 0       | 164                  |
| 5:45 PM                | 2                   | 3        | 0       | 0       | 7          | 2        | 7         | 0       | 9         | 40        | 2        | 0       | 0         | 46        | 6        | 0       | 124                  |
| <b>TOTAL VOLUMES:</b>  | NL<br>44            | NT<br>63 | NR<br>6 | NU<br>0 | SL<br>108  | ST<br>45 | SR<br>102 | SU<br>0 | EL<br>105 | ET<br>378 | ER<br>38 | EU<br>0 | WL<br>15  | WT<br>489 | WR<br>58 | WU<br>0 | <b>TOTAL</b><br>1451 |
| <b>APPROACH %'s:</b>   | 38.94%              | 55.75%   | 5.31%   | 0.00%   | 42.35%     | 17.65%   | 40.00%    | 0.00%   | 20.15%    | 72.55%    | 7.29%    | 0.00%   | 2.67%     | 87.01%    | 10.32%   | 0.00%   |                      |
| <b>PEAK HR:</b>        | 04:15 PM - 05:15 PM |          |         |         | 68         | 22       | 67        | 0       | 54        | 204       | 20       | 0       | 7         | 259       | 31       | 0       | <b>TOTAL</b><br>800  |
| <b>PEAK HR VOL:</b>    | 29                  | 36       | 3       | 0       | 68         | 22       | 67        | 0       | 54        | 204       | 20       | 0       | 7         | 259       | 31       | 0       | 0.957                |
| <b>PEAK HR FACTOR:</b> | 0.725               | 0.692    | 0.375   | 0.000   | 0.680      | 0.786    | 0.644     | 0.000   | 0.900     | 0.962     | 0.556    | 0.000   | 0.292     | 0.887     | 0.646    | 0.000   |                      |
|                        | 0.708               |          |         |         | 0.677      |          |           |         | 0.914     |           |          |         | 0.863     |           |          |         |                      |

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Campus Dr & W Lacey Blvd  
**City:** Hanford  
**Control:** Signalized

**Project ID:** 20-090149-001  
**Date:** 10/1/2020

### Total

| NS/EW Streets:         | Campus Dr           |         |         |         | Campus Dr  |         |         |         | W Lacey Blvd |         |         |         | W Lacey Blvd |         |         |         |       |
|------------------------|---------------------|---------|---------|---------|------------|---------|---------|---------|--------------|---------|---------|---------|--------------|---------|---------|---------|-------|
| AM                     | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND    |         |         |         | WESTBOUND    |         |         |         | TOTAL |
|                        | 1<br>NL             | 1<br>NT | 0<br>NR | 0<br>NU | 1<br>SL    | 1<br>ST | 1<br>SR | 0<br>SU | 1<br>EL      | 2<br>ET | 1<br>ER | 0<br>EU | 1<br>WL      | 2<br>WT | 1<br>WR | 0<br>WU |       |
| 7:00 AM                | 2                   | 2       | 4       | 0       | 1          | 9       | 0       | 0       | 1            | 31      | 0       | 0       | 5            | 27      | 3       | 0       | 85    |
| 7:15 AM                | 3                   | 4       | 8       | 0       | 3          | 4       | 2       | 0       | 2            | 44      | 3       | 1       | 4            | 43      | 8       | 0       | 129   |
| 7:30 AM                | 7                   | 12      | 7       | 0       | 5          | 9       | 3       | 0       | 4            | 52      | 4       | 1       | 17           | 44      | 14      | 1       | 180   |
| 7:45 AM                | 9                   | 19      | 11      | 0       | 3          | 11      | 1       | 0       | 2            | 68      | 9       | 0       | 15           | 60      | 24      | 0       | 232   |
| 8:00 AM                | 7                   | 14      | 11      | 0       | 5          | 15      | 3       | 0       | 3            | 71      | 12      | 3       | 6            | 60      | 7       | 0       | 217   |
| 8:15 AM                | 1                   | 6       | 4       | 0       | 10         | 11      | 2       | 0       | 2            | 70      | 2       | 1       | 11           | 75      | 8       | 0       | 203   |
| 8:30 AM                | 2                   | 8       | 13      | 0       | 9          | 13      | 3       | 0       | 2            | 79      | 1       | 1       | 7            | 75      | 10      | 0       | 223   |
| 8:45 AM                | 3                   | 8       | 10      | 0       | 10         | 11      | 1       | 0       | 3            | 80      | 5       | 0       | 12           | 90      | 8       | 0       | 241   |
| <b>TOTAL VOLUMES:</b>  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL           | ET      | ER      | EU      | WL           | WT      | WR      | WU      | TOTAL |
| <b>APPROACH %'s:</b>   | 34                  | 73      | 68      | 0       | 46         | 83      | 15      | 0       | 19           | 495     | 36      | 7       | 77           | 474     | 82      | 1       | 1510  |
|                        | 19.43%              | 41.71%  | 38.86%  | 0.00%   | 31.94%     | 57.64%  | 10.42%  | 0.00%   | 3.41%        | 88.87%  | 6.46%   | 1.26%   | 12.15%       | 74.76%  | 12.93%  | 0.16%   |       |
| <b>PEAK HR:</b>        | 08:00 AM - 09:00 AM |         |         |         | 34         | 50      | 9       | 0       | 10           | 300     | 20      | 5       | 36           | 300     | 33      | 0       | TOTAL |
| <b>PEAK HR VOL:</b>    | 13                  | 36      | 38      | 0       |            |         |         |         |              |         |         |         |              |         |         |         | 884   |
| <b>PEAK HR FACTOR:</b> | 0.464               | 0.643   | 0.731   | 0.000   | 0.850      | 0.833   | 0.750   | 0.000   | 0.833        | 0.938   | 0.417   | 0.417   | 0.750        | 0.833   | 0.825   | 0.000   | 0.917 |
|                        |                     |         | 0.680   |         |            |         | 0.930   |         |              |         | 0.941   |         |              |         | 0.839   |         |       |

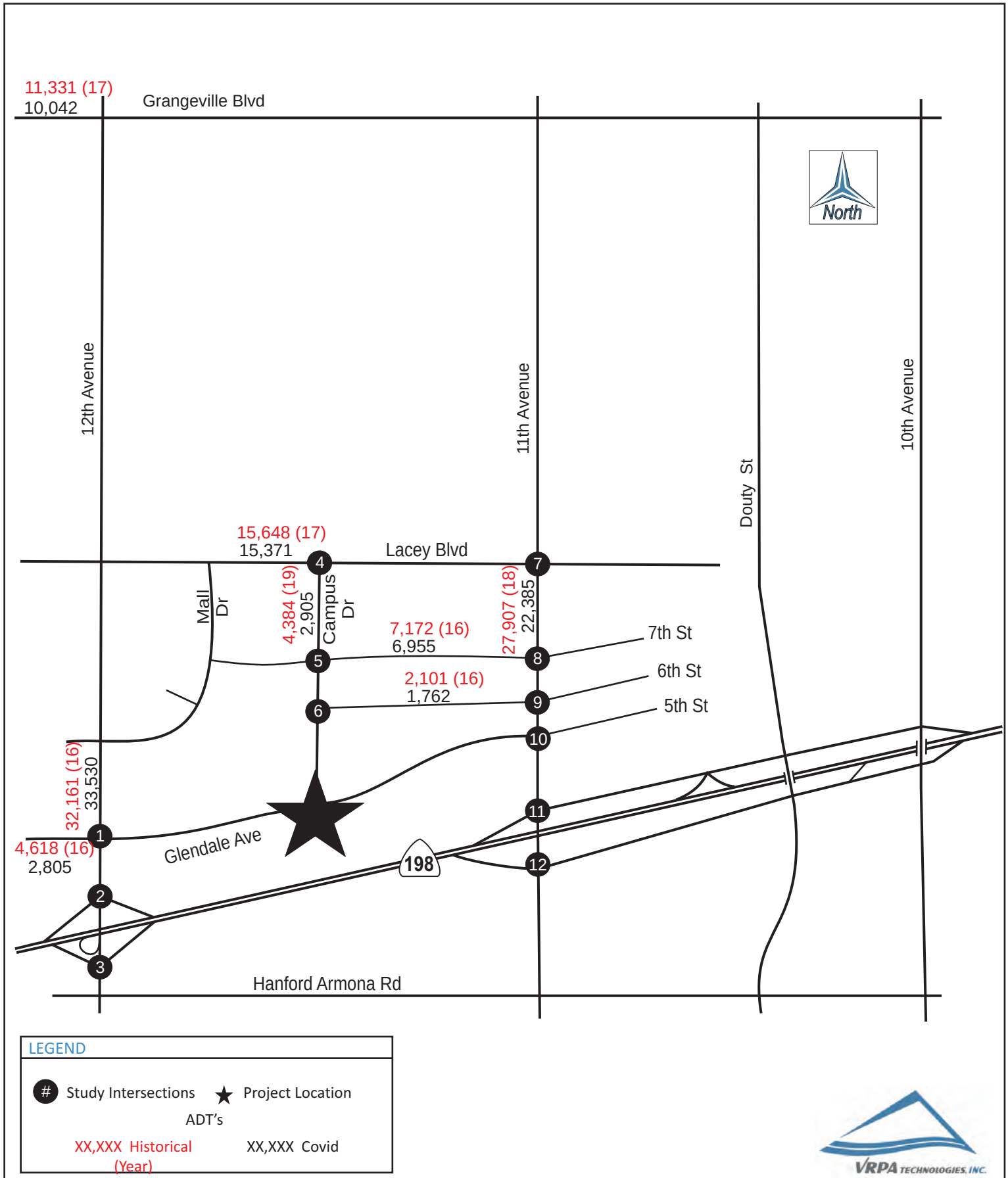
  

| PM                     | NORTHBOUND          |         |         |         | SOUTHBOUND |         |         |         | EASTBOUND |         |         |         | WESTBOUND |         |         |         | TOTAL |
|------------------------|---------------------|---------|---------|---------|------------|---------|---------|---------|-----------|---------|---------|---------|-----------|---------|---------|---------|-------|
|                        | 1<br>NL             | 1<br>NT | 0<br>NR | 0<br>NU | 1<br>SL    | 1<br>ST | 1<br>SR | 0<br>SU | 1<br>EL   | 2<br>ET | 1<br>ER | 0<br>EU | 1<br>WL   | 2<br>WT | 1<br>WR | 0<br>WU |       |
| 4:00 PM                | 4                   | 14      | 19      | 0       | 20         | 13      | 8       | 0       | 11        | 149     | 4       | 1       | 9         | 173     | 9       | 0       | 434   |
| 4:15 PM                | 5                   | 12      | 27      | 0       | 16         | 11      | 4       | 0       | 4         | 146     | 6       | 2       | 10        | 156     | 6       | 0       | 405   |
| 4:30 PM                | 4                   | 11      | 21      | 0       | 24         | 25      | 11      | 0       | 4         | 136     | 2       | 0       | 7         | 144     | 8       | 0       | 397   |
| 4:45 PM                | 5                   | 12      | 17      | 0       | 14         | 14      | 4       | 0       | 9         | 121     | 4       | 1       | 7         | 167     | 5       | 0       | 380   |
| 5:00 PM                | 14                  | 17      | 26      | 0       | 23         | 16      | 7       | 0       | 3         | 166     | 13      | 0       | 16        | 164     | 14      | 0       | 479   |
| 5:15 PM                | 4                   | 6       | 17      | 0       | 9          | 13      | 4       | 0       | 5         | 141     | 5       | 1       | 6         | 158     | 10      | 0       | 379   |
| 5:30 PM                | 3                   | 13      | 15      | 0       | 5          | 9       | 9       | 0       | 5         | 126     | 3       | 0       | 6         | 152     | 8       | 0       | 354   |
| 5:45 PM                | 2                   | 6       | 13      | 0       | 6          | 4       | 2       | 0       | 6         | 107     | 2       | 0       | 5         | 140     | 4       | 0       | 297   |
| <b>TOTAL VOLUMES:</b>  | NL                  | NT      | NR      | NU      | SL         | ST      | SR      | SU      | EL        | ET      | ER      | EU      | WL        | WT      | WR      | WU      | TOTAL |
| <b>APPROACH %'s:</b>   | 41                  | 91      | 155     | 0       | 117        | 105     | 49      | 0       | 47        | 1092    | 39      | 5       | 66        | 1254    | 64      | 0       | 3125  |
|                        | 14.29%              | 31.71%  | 54.01%  | 0.00%   | 43.17%     | 38.75%  | 18.08%  | 0.00%   | 3.97%     | 92.31%  | 3.30%   | 0.42%   | 4.77%     | 90.61%  | 4.62%   | 0.00%   |       |
| <b>PEAK HR:</b>        | 04:15 PM - 05:15 PM |         |         |         | 77         | 66      | 26      | 0       | 20        | 569     | 25      | 3       | 40        | 631     | 33      | 0       | TOTAL |
| <b>PEAK HR VOL:</b>    | 28                  | 52      | 91      | 0       |            |         |         |         |           |         |         |         |           |         |         |         | 1661  |
| <b>PEAK HR FACTOR:</b> | 0.500               | 0.765   | 0.843   | 0.000   | 0.802      | 0.660   | 0.591   | 0.000   | 0.556     | 0.857   | 0.481   | 0.375   | 0.625     | 0.945   | 0.589   | 0.000   | 0.867 |
|                        |                     |         | 0.750   |         |            |         | 0.704   |         |           |         | 0.848   |         |           |         | 0.907   |         |       |

# Hanford Place Development Traffic Impact Study

## Average Daily Traffic Historical vs Covid

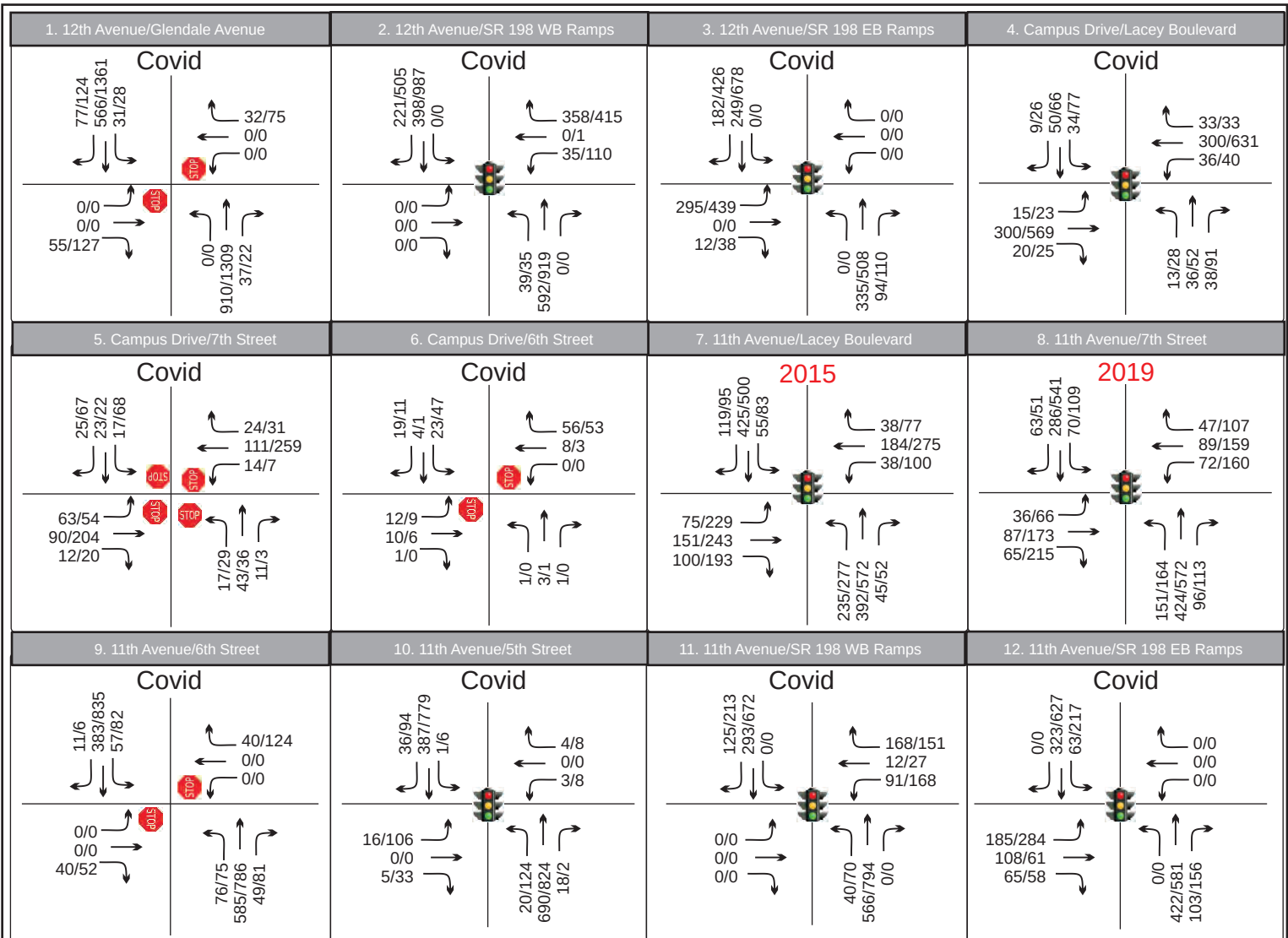
Figure  
7



# Hanford Place Development Traffic Impact Study

## Historical vs Covid

Figure  
7



### LEGEND

# Study Intersections ← AM/PM Peakhour





# **APPENDIX C**

## **SYNCHRO 10 (HCM 6<sup>th</sup> Edition) Worksheets**

# EXISTING WORKSHEETS

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

10/31/2020

| Intersection             |      |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 1.2  |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL  | EBT  | EBR                                                                               | WBL  | WBT  | WBR                                                                               | NBL  | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |      |      |  |      |      |  |      |  |      |  |  |      |
| Traffic Vol, veh/h       | 0    | 0    | 72                                                                                | 0    | 0    | 42                                                                                | 0    | 1183                                                                              | 48   | 40                                                                                  | 736                                                                                 | 100  |
| Future Vol, veh/h        | 0    | 0    | 72                                                                                | 0    | 0    | 42                                                                                | 0    | 1183                                                                              | 48   | 40                                                                                  | 736                                                                                 | 100  |
| Conflicting Peds, #/hr   | 0    | 0    | 0                                                                                 | 0    | 0    | 0                                                                                 | 0    | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop | Stop | Stop                                                                              | Stop | Stop | Stop                                                                              | Free | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -    | -    | None                                                                              | -    | -    | None                                                                              | -    | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | -    | -    | 0                                                                                 | -    | -    | 0                                                                                 | -    | -                                                                                 | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -    | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -    | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 88   | 88   | 88                                                                                | 88   | 88   | 88                                                                                | 88   | 88                                                                                | 88   | 88                                                                                  | 88                                                                                  | 88   |
| Heavy Vehicles, %        | 3    | 3    | 3                                                                                 | 3    | 3    | 3                                                                                 | 3    | 3                                                                                 | 3    | 3                                                                                   | 3                                                                                   | 3    |
| Mvmt Flow                | 0    | 0    | 82                                                                                | 0    | 0    | 48                                                                                | 0    | 1344                                                                              | 55   | 45                                                                                  | 836                                                                                 | 114  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |      |
|----------------------|--------|---|--------|---|--------|------|--------|------|
| Conflicting Flow All | -      | - | 475    | - | -      | 700  | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16 | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93 | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | 456    | 0 | 0      | 326  | 0      | 248  |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | 456    | - | -      | 326  | -      | 248  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |

| Approach             | EB   | WB   | NB | SB |
|----------------------|------|------|----|----|
| HCM Control Delay, s | 14.6 | 17.9 | 0  | 1  |
| HCM LOS              | B    | C    |    |    |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | -   | -   | 456        | 326   | 248   | -   |
| HCM Lane V/C Ratio    | -   | -   | 0.179      | 0.146 | 0.183 | -   |
| HCM Control Delay (s) | -   | -   | 14.6       | 17.9  | 22.7  | -   |
| HCM Lane LOS          | -   | -   | B          | C     | C     | -   |
| HCM 95th %tile Q(veh) | -   | -   | 0.6        | 0.5   | 0.7   | -   |

HCM 6th TWSC  
6: Campus Dr & 6th Street

10/31/2020

| Intersection             |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|--------------------------|--------|-----------------------------------------------------------------------------------|--------|------------|-----------------------------------------------------------------------------------|-------|--------|-----------------------------------------------------------------------------------|------|-------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 7.2    |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Movement                 | EBL    | EBT                                                                               | EBR    | WBL        | WBT                                                                               | WBR   | NBL    | NBT                                                                               | NBR  | SBL   | SBT                                                                                 | SBR  |
| Lane Configurations      |        |  |        |            |  |       |        |  |      |       |  |      |
| Traffic Vol, veh/h       | 16     | 13                                                                                | 1      | 0          | 10                                                                                | 73    | 1      | 4                                                                                 | 1    | 30    | 5                                                                                   | 25   |
| Future Vol, veh/h        | 16     | 13                                                                                | 1      | 0          | 10                                                                                | 73    | 1      | 4                                                                                 | 1    | 30    | 5                                                                                   | 25   |
| Conflicting Peds, #/hr   | 0      | 0                                                                                 | 0      | 0          | 0                                                                                 | 0     | 0      | 0                                                                                 | 0    | 0     | 0                                                                                   | 0    |
| Sign Control             | Stop   | Stop                                                                              | Stop   | Stop       | Stop                                                                              | Stop  | Free   | Free                                                                              | Free | Free  | Free                                                                                | Free |
| RT Channelized           | -      | -                                                                                 | None   | -          | -                                                                                 | None  | -      | -                                                                                 | None | -     | -                                                                                   | None |
| Storage Length           | -      | -                                                                                 | -      | -          | -                                                                                 | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Veh in Median Storage, # | -      | 0                                                                                 | -      | -          | 0                                                                                 | -     | -      | 0                                                                                 | -    | -     | 0                                                                                   | -    |
| Grade, %                 | -      | 0                                                                                 | -      | -          | 0                                                                                 | -     | -      | 0                                                                                 | -    | -     | 0                                                                                   | -    |
| Peak Hour Factor         | 70     | 70                                                                                | 70     | 70         | 70                                                                                | 70    | 70     | 70                                                                                | 70   | 70    | 70                                                                                  | 70   |
| Heavy Vehicles, %        | 3      | 3                                                                                 | 3      | 3          | 3                                                                                 | 3     | 3      | 3                                                                                 | 3    | 3     | 3                                                                                   | 3    |
| Mvmt Flow                | 23     | 19                                                                                | 1      | 0          | 14                                                                                | 104   | 1      | 6                                                                                 | 1    | 43    | 7                                                                                   | 36   |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Major/Minor              | Minor2 |                                                                                   | Minor1 |            | Major1                                                                            |       | Major2 |                                                                                   |      |       |                                                                                     |      |
| Conflicting Flow All     | 179    | 120                                                                               | 25     | 130        | 138                                                                               | 7     | 43     | 0                                                                                 | 0    | 7     | 0                                                                                   | 0    |
| Stage 1                  | 111    | 111                                                                               | -      | 9          | 9                                                                                 | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 68     | 9                                                                                 | -      | 121        | 129                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Critical Hdwy            | 7.13   | 6.53                                                                              | 6.23   | 7.13       | 6.53                                                                              | 6.23  | 4.13   | -                                                                                 | -    | 4.13  | -                                                                                   | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53                                                                              | -      | 6.13       | 5.53                                                                              | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53                                                                              | -      | 6.13       | 5.53                                                                              | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Follow-up Hdwy           | 3.527  | 4.027                                                                             | 3.327  | 3.527      | 4.027                                                                             | 3.327 | 2.227  | -                                                                                 | -    | 2.227 | -                                                                                   | -    |
| Pot Cap-1 Maneuver       | 781    | 768                                                                               | 1048   | 840        | 751                                                                               | 1072  | 1559   | -                                                                                 | -    | 1607  | -                                                                                   | -    |
| Stage 1                  | 892    | 802                                                                               | -      | 1010       | 886                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 940    | 886                                                                               | -      | 881        | 787                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Platoon blocked, %       |        |                                                                                   |        |            |                                                                                   |       |        | -                                                                                 | -    |       | -                                                                                   | -    |
| Mov Cap-1 Maneuver       | 679    | 746                                                                               | 1048   | 805        | 729                                                                               | 1072  | 1559   | -                                                                                 | -    | 1607  | -                                                                                   | -    |
| Mov Cap-2 Maneuver       | 679    | 746                                                                               | -      | 805        | 729                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 1                  | 891    | 780                                                                               | -      | 1009       | 885                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 834    | 885                                                                               | -      | 835        | 765                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Approach                 | EB     |                                                                                   | WB     |            | NB                                                                                |       | SB     |                                                                                   |      |       |                                                                                     |      |
| HCM Control Delay, s     | 10.4   |                                                                                   | 9      |            | 1.2                                                                               |       | 3.7    |                                                                                   |      |       |                                                                                     |      |
| HCM LOS                  | B      |                                                                                   | A      |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Minor Lane/Major Mvmt    | NBL    | NBT                                                                               | NBR    | EBLn1WBLn1 | SBL                                                                               | SBT   | SBR    |                                                                                   |      |       |                                                                                     |      |
| Capacity (veh/h)         | 1559   | -                                                                                 | -      | 715 1014   | 1607                                                                              | -     | -      |                                                                                   |      |       |                                                                                     |      |
| HCM Lane V/C Ratio       | 0.001  | -                                                                                 | -      | 0.06 0.117 | 0.027                                                                             | -     | -      |                                                                                   |      |       |                                                                                     |      |
| HCM Control Delay (s)    | 7.3    | 0                                                                                 | -      | 10.4 9     | 7.3                                                                               | 0     | -      |                                                                                   |      |       |                                                                                     |      |
| HCM Lane LOS             | A      | A                                                                                 | -      | B A        | A                                                                                 | A     | -      |                                                                                   |      |       |                                                                                     |      |
| HCM 95th %tile Q(veh)    | 0      | -                                                                                 | -      | 0.2 0.4    | 0.1                                                                               | -     | -      |                                                                                   |      |       |                                                                                     |      |

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 1.8  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↰    |      |      | ↰    | ↰    | ↰↱   |      | ↰    | ↰↱   |      |
| Traffic Vol, veh/h       | 0    | 0    | 52   | 0    | 0    | 52   | 99   | 761  | 64   | 74   | 498  | 14   |
| Future Vol, veh/h        | 0    | 0    | 52   | 0    | 0    | 52   | 99   | 761  | 64   | 74   | 498  | 14   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | 75   | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 60   | 0    | 0    | 60   | 114  | 875  | 74   | 85   | 572  | 16   |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |   |
|----------------------|--------|---|--------|---|--------|------|--------|---|
| Conflicting Flow All | -      | - | 294    | - | -      | 475  | 588    | 0 |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy        | -      | - | 6.96   | - | -      | 6.96 | 4.16   | - |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | - |
| Follow-up Hdwy       | -      | - | 3.33   | - | -      | 3.33 | 2.23   | - |
| Pot Cap-1 Maneuver   | 0      | 0 | 699    | 0 | 0      | 533  | 976    | - |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | - |
| Mov Cap-1 Maneuver   | -      | - | 699    | - | -      | 533  | 976    | - |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | - |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |

| Approach             | EB   | WB   | NB | SB  |
|----------------------|------|------|----|-----|
| HCM Control Delay, s | 10.6 | 12.6 | 1  | 1.4 |
| HCM LOS              | B    | B    |    |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 976   | -   | -   | 699        | 533   | 713   | -   |
| HCM Lane V/C Ratio    | 0.117 | -   | -   | 0.086      | 0.112 | 0.119 | -   |
| HCM Control Delay (s) | 9.2   | -   | -   | 10.6       | 12.6  | 10.7  | -   |
| HCM Lane LOS          | A     | -   | -   | B          | B     | B     | -   |
| HCM 95th %tile Q(veh) | 0.4   | -   | -   | 0.3        | 0.4   | 0.4   | -   |



# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 46                                                                                | 465                                                                               | 51                                                                                | 770                                                                               | 0                                                                                 | 0                                                                                 | 517                                                                                 | 287                                                                                 | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 46                                                                                | 465                                                                               | 51                                                                                | 770                                                                               | 0                                                                                 | 0                                                                                 | 517                                                                                 | 287                                                                                 | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 51                                                                                | 517                                                                               | 57                                                                                | 856                                                                               | 0                                                                                 | 0                                                                                 | 574                                                                                 | 319                                                                                 |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                                | 0.90                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 370                                                                               | 658                                                                               | 82                                                                                | 2366                                                                              | 0                                                                                 | 0                                                                                 | 1992                                                                                | 889                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.21                                                                              | 0.21                                                                              | 0.05                                                                              | 0.67                                                                              | 0.00                                                                              | 0.00                                                                              | 0.57                                                                                | 0.57                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 51                                                                                | 517                                                                               | 57                                                                                | 856                                                                               | 0                                                                                 | 0                                                                                 | 574                                                                                 | 319                                                                                 |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 1.8                                                                               | 11.7                                                                              | 2.4                                                                               | 7.9                                                                               | 0.0                                                                               | 0.0                                                                               | 6.4                                                                                 | 8.3                                                                                 |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 1.8                                                                               | 11.7                                                                              | 2.4                                                                               | 7.9                                                                               | 0.0                                                                               | 0.0                                                                               | 6.4                                                                                 | 8.3                                                                                 |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 370                                                                               | 658                                                                               | 82                                                                                | 2366                                                                              | 0                                                                                 | 0                                                                                 | 1992                                                                                | 889                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.14                                                                              | 0.79                                                                              | 0.70                                                                              | 0.36                                                                              | 0.00                                                                              | 0.00                                                                              | 0.29                                                                                | 0.36                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 716                                                                               | 1275                                                                              | 247                                                                               | 2366                                                                              | 0                                                                                 | 0                                                                                 | 1992                                                                                | 889                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 24.2                                                                              | 28.2                                                                              | 35.4                                                                              | 5.4                                                                               | 0.0                                                                               | 0.0                                                                               | 8.5                                                                                 | 8.9                                                                                 |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 0.2                                                                               | 2.1                                                                               | 10.2                                                                              | 0.4                                                                               | 0.0                                                                               | 0.0                                                                               | 0.4                                                                                 | 1.1                                                                                 |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 4.2                                                                               | 1.2                                                                               | 2.1                                                                               | 0.0                                                                               | 0.0                                                                               | 2.1                                                                                 | 2.6                                                                                 |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 24.4                                                                              | 30.3                                                                              | 45.6                                                                              | 5.8                                                                               | 0.0                                                                               | 0.0                                                                               | 8.9                                                                                 | 10.1                                                                                |                                                                                     |                                                                                     |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | D                                                                                 | A                                                                                 | A                                                                                 | A                                                                                 | A                                                                                   | B                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 568                                                                               |                                                                                   |                                                                                   | 913                                                                               |                                                                                   |                                                                                   | 893                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.7                                                                              |                                                                                   |                                                                                   | 8.3                                                                               |                                                                                   |                                                                                   | 9.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 55.0                                                                              |                                                                                   | 8.0                                                                               |                                                                                   | 47.0                                                                              | 20.2                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 50.5                                                                              |                                                                                   | 10.5                                                                              |                                                                                   | 35.5                                                                              | 30.5                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 9.9                                                                               |                                                                                   | 4.4                                                                               |                                                                                   | 10.3                                                                              | 13.7                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 6.7                                                                               |                                                                                   | 0.0                                                                               |                                                                                   | 5.0                                                                               | 2.0                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 13.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 3: 12th Avenue & SR 198 EB Off Ramps

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                     |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 384                                                                               | 0                                                                                 | 16                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 436                                                                                 | 122                                                                                 | 0                                                                                   | 324                                                                                 | 237                                                                                 |
| Future Volume (veh/h)        | 384                                                                               | 0                                                                                 | 16                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 436                                                                                 | 122                                                                                 | 0                                                                                   | 324                                                                                 | 237                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 427                                                                               | 0                                                                                 | 18                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 484                                                                                 | 0                                                                                   | 0                                                                                   | 360                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 588                                                                               | 0                                                                                 | 270                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2439                                                                                |                                                                                     | 0                                                                                   | 2439                                                                                |                                                                                     |
| Arrive On Green              | 0.17                                                                              | 0.00                                                                              | 0.17                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.69                                                                                | 0.00                                                                                | 0.00                                                                                | 0.69                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 427                                                                               | 0                                                                                 | 18                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 484                                                                                 | 0                                                                                   | 0                                                                                   | 360                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 7.8                                                                               | 0.0                                                                               | 0.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 3.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.3                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 7.8                                                                               | 0.0                                                                               | 0.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 3.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.3                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 588                                                                               | 0                                                                                 | 270                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2439                                                                                |                                                                                     | 0                                                                                   | 2439                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.73                                                                              | 0.00                                                                              | 0.07                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.20                                                                                |                                                                                     | 0.00                                                                                | 0.15                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1850                                                                              | 0                                                                                 | 849                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2439                                                                                |                                                                                     | 0                                                                                   | 2439                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 25.8                                                                              | 0.0                                                                               | 22.8                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 3.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 3.5                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 1.7                                                                               | 0.0                                                                               | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.1                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 3.0                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.7                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.5                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 27.5                                                                              | 0.0                                                                               | 22.9                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 3.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 3.6                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                   | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 445                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 484                                                                                 |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 27.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 3.8                                                                                 |                                                                                     |                                                                                     | 3.6                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 50.0                                                                              |                                                                                   |                                                                                   | 15.8                                                                              |                                                                                   |                                                                                   | 50.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 45.5                                                                              |                                                                                   |                                                                                   | 35.5                                                                              |                                                                                   |                                                                                   | 45.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 5.2                                                                               |                                                                                   |                                                                                   | 9.8                                                                               |                                                                                   |                                                                                   | 4.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 3.3                                                                               |                                                                                   |                                                                                   | 1.5                                                                               |                                                                                   |                                                                                   | 2.4                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 11.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 20                                                                                | 390                                                                               | 26                                                                                | 47                                                                                | 390                                                                               | 43                                                                                | 17                                                                                 | 47                                                                                  | 49                                                                                  | 44                                                                                  | 65                                                                                  | 12                                                                                  |
| Future Volume (veh/h)        | 20                                                                                | 390                                                                               | 26                                                                                | 47                                                                                | 390                                                                               | 43                                                                                | 17                                                                                 | 47                                                                                  | 49                                                                                  | 44                                                                                  | 65                                                                                  | 12                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 22                                                                                | 424                                                                               | 28                                                                                | 51                                                                                | 424                                                                               | 47                                                                                | 18                                                                                 | 51                                                                                  | 53                                                                                  | 48                                                                                  | 71                                                                                  | 13                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 44                                                                                | 625                                                                               | 279                                                                               | 81                                                                                | 698                                                                               | 311                                                                               | 38                                                                                 | 386                                                                                 | 401                                                                                 | 78                                                                                  | 902                                                                                 | 765                                                                                 |
| Arrive On Green              | 0.03                                                                              | 0.18                                                                              | 0.18                                                                              | 0.05                                                                              | 0.20                                                                              | 0.20                                                                              | 0.02                                                                               | 0.46                                                                                | 0.46                                                                                | 0.04                                                                                | 0.49                                                                                | 0.49                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                               | 833                                                                                 | 866                                                                                 | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 22                                                                                | 424                                                                               | 28                                                                                | 51                                                                                | 424                                                                               | 47                                                                                | 18                                                                                 | 0                                                                                   | 104                                                                                 | 48                                                                                  | 71                                                                                  | 13                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                               | 0                                                                                   | 1700                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.8                                                                               | 7.5                                                                               | 1.0                                                                               | 1.9                                                                               | 7.3                                                                               | 1.7                                                                               | 0.7                                                                                | 0.0                                                                                 | 2.3                                                                                 | 1.8                                                                                 | 1.4                                                                                 | 0.3                                                                                 |
| Cycle Q Clear(g_c), s        | 0.8                                                                               | 7.5                                                                               | 1.0                                                                               | 1.9                                                                               | 7.3                                                                               | 1.7                                                                               | 0.7                                                                                | 0.0                                                                                 | 2.3                                                                                 | 1.8                                                                                 | 1.4                                                                                 | 0.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 0.51                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 44                                                                                | 625                                                                               | 279                                                                               | 81                                                                                | 698                                                                               | 311                                                                               | 38                                                                                 | 0                                                                                   | 788                                                                                 | 78                                                                                  | 902                                                                                 | 765                                                                                 |
| V/C Ratio(X)                 | 0.50                                                                              | 0.68                                                                              | 0.10                                                                              | 0.63                                                                              | 0.61                                                                              | 0.15                                                                              | 0.48                                                                               | 0.00                                                                                | 0.13                                                                                | 0.62                                                                                | 0.08                                                                                | 0.02                                                                                |
| Avail Cap(c_a), veh/h        | 198                                                                               | 1240                                                                              | 553                                                                               | 251                                                                               | 1345                                                                              | 600                                                                               | 172                                                                                | 0                                                                                   | 788                                                                                 | 251                                                                                 | 902                                                                                 | 765                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 32.2                                                                              | 25.7                                                                              | 23.0                                                                              | 31.3                                                                              | 24.4                                                                              | 22.2                                                                              | 32.3                                                                               | 0.0                                                                                 | 10.2                                                                                | 31.4                                                                                | 9.2                                                                                 | 8.9                                                                                 |
| Incr Delay (d2), s/veh       | 8.3                                                                               | 1.3                                                                               | 0.2                                                                               | 7.8                                                                               | 0.9                                                                               | 0.2                                                                               | 9.2                                                                                | 0.0                                                                                 | 0.3                                                                                 | 7.6                                                                                 | 0.2                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.4                                                                               | 3.0                                                                               | 0.4                                                                               | 0.9                                                                               | 2.9                                                                               | 0.6                                                                               | 0.4                                                                                | 0.0                                                                                 | 0.9                                                                                 | 0.9                                                                                 | 0.5                                                                                 | 0.1                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 40.5                                                                              | 27.0                                                                              | 23.2                                                                              | 39.2                                                                              | 25.3                                                                              | 22.4                                                                              | 41.5                                                                               | 0.0                                                                                 | 10.6                                                                                | 39.0                                                                                | 9.3                                                                                 | 8.9                                                                                 |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                  | A                                                                                   | B                                                                                   | D                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 474                                                                               |                                                                                   |                                                                                   | 522                                                                               |                                                                                   |                                                                                   | 122                                                                                |                                                                                     |                                                                                     | 132                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 27.4                                                                              |                                                                                   |                                                                                   | 26.4                                                                              |                                                                                   |                                                                                   | 15.2                                                                               |                                                                                     |                                                                                     | 20.1                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 7.4                                                                               | 35.5                                                                              | 7.6                                                                               | 16.3                                                                              | 5.9                                                                               | 37.0                                                                              | 6.2                                                                                | 17.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.5                                                                               | 29.5                                                                              | 9.5                                                                               | 23.5                                                                              | 6.5                                                                               | 32.5                                                                              | 7.5                                                                                | 25.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 3.8                                                                               | 4.3                                                                               | 3.9                                                                               | 9.5                                                                               | 2.7                                                                               | 3.4                                                                               | 2.8                                                                                | 9.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.5                                                                               | 0.0                                                                               | 2.3                                                                               | 0.0                                                                               | 0.4                                                                               | 0.0                                                                                | 2.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 25.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 83                                                                                | 167                                                                               | 110                                                                               | 42                                                                                | 203                                                                               | 42                                                                                | 259                                                                                | 433                                                                                 | 50                                                                                  | 61                                                                                  | 469                                                                                 | 131                                                                                 |
| Future Volume (veh/h)        | 83                                                                                | 167                                                                               | 110                                                                               | 42                                                                                | 203                                                                               | 42                                                                                | 259                                                                                | 433                                                                                 | 50                                                                                  | 61                                                                                  | 469                                                                                 | 131                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 92                                                                                | 186                                                                               | 122                                                                               | 47                                                                                | 226                                                                               | 47                                                                                | 288                                                                                | 481                                                                                 | 56                                                                                  | 68                                                                                  | 521                                                                                 | 146                                                                                 |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                               | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 214                                                                               | 445                                                                               | 198                                                                               | 113                                                                               | 372                                                                               | 76                                                                                | 402                                                                                | 1523                                                                                | 177                                                                                 | 96                                                                                  | 1466                                                                                | 654                                                                                 |
| Arrive On Green              | 0.06                                                                              | 0.13                                                                              | 0.13                                                                              | 0.06                                                                              | 0.13                                                                              | 0.13                                                                              | 0.12                                                                               | 0.48                                                                                | 0.48                                                                                | 0.05                                                                                | 0.42                                                                                | 0.42                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2916                                                                              | 595                                                                               | 3428                                                                               | 3183                                                                                | 369                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 92                                                                                | 186                                                                               | 122                                                                               | 47                                                                                | 135                                                                               | 138                                                                               | 288                                                                                | 266                                                                                 | 271                                                                                 | 68                                                                                  | 521                                                                                 | 146                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1748                                                                              | 1714                                                                               | 1763                                                                                | 1789                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.7                                                                               | 3.2                                                                               | 4.8                                                                               | 1.7                                                                               | 4.7                                                                               | 4.9                                                                               | 5.3                                                                                | 6.0                                                                                 | 6.1                                                                                 | 2.5                                                                                 | 6.6                                                                                 | 2.5                                                                                 |
| Cycle Q Clear(g_c), s        | 1.7                                                                               | 3.2                                                                               | 4.8                                                                               | 1.7                                                                               | 4.7                                                                               | 4.9                                                                               | 5.3                                                                                | 6.0                                                                                 | 6.1                                                                                 | 2.5                                                                                 | 6.6                                                                                 | 2.5                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.34                                                                              | 1.00                                                                               |                                                                                     | 0.21                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 214                                                                               | 445                                                                               | 198                                                                               | 113                                                                               | 225                                                                               | 223                                                                               | 402                                                                                | 843                                                                                 | 856                                                                                 | 96                                                                                  | 1466                                                                                | 654                                                                                 |
| V/C Ratio(X)                 | 0.43                                                                              | 0.42                                                                              | 0.62                                                                              | 0.42                                                                              | 0.60                                                                              | 0.62                                                                              | 0.72                                                                               | 0.31                                                                                | 0.32                                                                                | 0.71                                                                                | 0.36                                                                                | 0.22                                                                                |
| Avail Cap(c_a), veh/h        | 290                                                                               | 1455                                                                              | 649                                                                               | 182                                                                               | 760                                                                               | 754                                                                               | 607                                                                                | 843                                                                                 | 856                                                                                 | 248                                                                                 | 1466                                                                                | 654                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 29.3                                                                              | 26.2                                                                              | 26.9                                                                              | 29.2                                                                              | 26.8                                                                              | 26.8                                                                              | 27.6                                                                               | 10.4                                                                                | 10.4                                                                                | 30.2                                                                                | 13.0                                                                                | 5.3                                                                                 |
| Incr Delay (d2), s/veh       | 1.4                                                                               | 0.6                                                                               | 3.1                                                                               | 2.4                                                                               | 2.6                                                                               | 2.8                                                                               | 2.4                                                                                | 1.0                                                                                 | 1.0                                                                                 | 9.1                                                                                 | 0.7                                                                                 | 0.8                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 1.3                                                                               | 1.8                                                                               | 0.7                                                                               | 2.0                                                                               | 2.1                                                                               | 2.2                                                                                | 2.2                                                                                 | 2.2                                                                                 | 1.2                                                                                 | 2.4                                                                                 | 1.3                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.7                                                                              | 26.8                                                                              | 30.0                                                                              | 31.7                                                                              | 29.3                                                                              | 29.6                                                                              | 30.0                                                                               | 11.4                                                                                | 11.4                                                                                | 39.3                                                                                | 13.7                                                                                | 6.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | C                                                                                 | C                                                                                 | C                                                                                 | C                                                                                 | C                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | B                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 400                                                                               |                                                                                   |                                                                                   | 320                                                                               |                                                                                   |                                                                                   | 825                                                                                |                                                                                     |                                                                                     | 735                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 28.7                                                                              |                                                                                   |                                                                                   | 29.8                                                                              |                                                                                   |                                                                                   | 17.9                                                                               |                                                                                     |                                                                                     | 14.5                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.0                                                                               | 35.6                                                                              | 8.6                                                                               | 12.7                                                                              | 12.1                                                                              | 31.5                                                                              | 8.5                                                                                | 12.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.1                                                                               | 29.4                                                                              | 6.7                                                                               | 26.8                                                                              | 11.5                                                                              | 27.0                                                                              | 5.5                                                                                | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 4.5                                                                               | 8.1                                                                               | 3.7                                                                               | 6.8                                                                               | 7.3                                                                               | 8.6                                                                               | 3.7                                                                                | 6.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.1                                                                               | 0.0                                                                               | 1.4                                                                               | 0.4                                                                               | 3.7                                                                               | 0.0                                                                                | 1.4                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 20.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 8: 11th Avenue & 7th Street

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 37                                                                                | 89                                                                                | 66                                                                                | 73                                                                                | 91                                                                                | 48                                                                                | 154                                                                                | 432                                                                                 | 98                                                                                  | 71                                                                                  | 292                                                                                 | 64                                                                                  |
| Future Volume (veh/h)        | 37                                                                                | 89                                                                                | 66                                                                                | 73                                                                                | 91                                                                                | 48                                                                                | 154                                                                                | 432                                                                                 | 98                                                                                  | 71                                                                                  | 292                                                                                 | 64                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 42                                                                                | 101                                                                               | 75                                                                                | 83                                                                                | 103                                                                               | 55                                                                                | 175                                                                                | 491                                                                                 | 111                                                                                 | 81                                                                                  | 332                                                                                 | 73                                                                                  |
| Peak Hour Factor             | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                               | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 143                                                                               | 198                                                                               | 135                                                                               | 109                                                                               | 270                                                                               | 135                                                                               | 221                                                                                | 1715                                                                                | 765                                                                                 | 108                                                                                 | 1489                                                                                | 664                                                                                 |
| Arrive On Green              | 0.04                                                                              | 0.10                                                                              | 0.10                                                                              | 0.06                                                                              | 0.12                                                                              | 0.12                                                                              | 0.12                                                                               | 0.49                                                                                | 0.49                                                                                | 0.06                                                                                | 0.42                                                                                | 0.42                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 2002                                                                              | 1370                                                                              | 1767                                                                              | 2273                                                                              | 1140                                                                              | 1767                                                                               | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 42                                                                                | 88                                                                                | 88                                                                                | 83                                                                                | 78                                                                                | 80                                                                                | 175                                                                                | 491                                                                                 | 111                                                                                 | 81                                                                                  | 332                                                                                 | 73                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1609                                                                              | 1767                                                                              | 1763                                                                              | 1650                                                                              | 1767                                                                               | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.7                                                                               | 2.9                                                                               | 3.2                                                                               | 2.8                                                                               | 2.5                                                                               | 2.7                                                                               | 5.9                                                                                | 5.1                                                                                 | 1.4                                                                                 | 2.8                                                                                 | 3.7                                                                                 | 1.7                                                                                 |
| Cycle Q Clear(g_c), s        | 0.7                                                                               | 2.9                                                                               | 3.2                                                                               | 2.8                                                                               | 2.5                                                                               | 2.7                                                                               | 5.9                                                                                | 5.1                                                                                 | 1.4                                                                                 | 2.8                                                                                 | 3.7                                                                                 | 1.7                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.85                                                                              | 1.00                                                                              |                                                                                   | 0.69                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 143                                                                               | 174                                                                               | 159                                                                               | 109                                                                               | 209                                                                               | 196                                                                               | 221                                                                                | 1715                                                                                | 765                                                                                 | 108                                                                                 | 1489                                                                                | 664                                                                                 |
| V/C Ratio(X)                 | 0.29                                                                              | 0.51                                                                              | 0.55                                                                              | 0.76                                                                              | 0.37                                                                              | 0.41                                                                              | 0.79                                                                               | 0.29                                                                                | 0.15                                                                                | 0.75                                                                                | 0.22                                                                                | 0.11                                                                                |
| Avail Cap(c_a), veh/h        | 278                                                                               | 744                                                                               | 680                                                                               | 215                                                                               | 816                                                                               | 764                                                                               | 359                                                                                | 1715                                                                                | 765                                                                                 | 281                                                                                 | 1489                                                                                | 664                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 28.6                                                                              | 26.3                                                                              | 26.5                                                                              | 28.4                                                                              | 25.0                                                                              | 25.1                                                                              | 26.2                                                                               | 9.4                                                                                 | 3.1                                                                                 | 28.5                                                                                | 11.3                                                                                | 10.8                                                                                |
| Incr Delay (d2), s/veh       | 1.1                                                                               | 2.3                                                                               | 3.0                                                                               | 10.5                                                                              | 1.1                                                                               | 1.4                                                                               | 6.3                                                                                | 0.4                                                                                 | 0.4                                                                                 | 10.1                                                                                | 0.3                                                                                 | 0.3                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.3                                                                               | 1.2                                                                               | 1.3                                                                               | 1.5                                                                               | 1.1                                                                               | 1.1                                                                               | 2.7                                                                                | 1.7                                                                                 | 0.8                                                                                 | 1.4                                                                                 | 1.3                                                                                 | 0.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 29.8                                                                              | 28.6                                                                              | 29.5                                                                              | 38.9                                                                              | 26.1                                                                              | 26.5                                                                              | 32.5                                                                               | 9.9                                                                                 | 3.5                                                                                 | 38.5                                                                                | 11.7                                                                                | 11.1                                                                                |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | C                                                                                  | A                                                                                   | A                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 218                                                                               |                                                                                   |                                                                                   | 241                                                                               |                                                                                   |                                                                                   | 777                                                                                |                                                                                     |                                                                                     | 486                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.2                                                                              |                                                                                   |                                                                                   | 30.6                                                                              |                                                                                   |                                                                                   | 14.0                                                                               |                                                                                     |                                                                                     | 16.1                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.2                                                                               | 34.4                                                                              | 8.3                                                                               | 10.6                                                                              | 12.2                                                                              | 30.5                                                                              | 7.1                                                                                | 11.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.8                                                                               | 28.7                                                                              | 7.5                                                                               | 26.0                                                                              | 12.5                                                                              | 26.0                                                                              | 5.0                                                                                | 28.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 4.8                                                                               | 7.1                                                                               | 4.8                                                                               | 5.2                                                                               | 7.9                                                                               | 5.7                                                                               | 2.7                                                                                | 4.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 3.5                                                                               | 0.0                                                                               | 0.9                                                                               | 0.2                                                                               | 2.2                                                                               | 0.0                                                                                | 0.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 18.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

10/31/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|--|--|--|--|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |  |  |  |  |  |  |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 21                                                                                | 0                                                                                 | 7                                                                                 | 4                                                                                 | 0                                                                                 | 5                                                                                 | 26                                                                                  | 897                                                                                 | 23                                                                                  | 1                                                                                   | 503                                                                                 | 47                                                                                  |  |  |  |  |  |  |
| Future Volume (veh/h)        | 21                                                                                | 0                                                                                 | 7                                                                                 | 4                                                                                 | 0                                                                                 | 5                                                                                 | 26                                                                                  | 897                                                                                 | 23                                                                                  | 1                                                                                   | 503                                                                                 | 47                                                                                  |  |  |  |  |  |  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |  |  |  |  |  |  |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |  |  |  |  |  |  |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |  |  |  |  |  |  |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |  |  |  |  |  |  |
| Adj Flow Rate, veh/h         | 24                                                                                | 0                                                                                 | 8                                                                                 | 5                                                                                 | 0                                                                                 | 6                                                                                 | 30                                                                                  | 1043                                                                                | 27                                                                                  | 1                                                                                   | 585                                                                                 | 55                                                                                  |  |  |  |  |  |  |
| Peak Hour Factor             | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                |  |  |  |  |  |  |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |  |  |  |  |  |  |
| Cap, veh/h                   | 179                                                                               | 0                                                                                 | 66                                                                                | 110                                                                               | 2                                                                                 | 33                                                                                | 58                                                                                  | 2588                                                                                | 67                                                                                  | 3                                                                                   | 2489                                                                                | 1110                                                                                |  |  |  |  |  |  |
| Arrive On Green              | 0.04                                                                              | 0.00                                                                              | 0.04                                                                              | 0.04                                                                              | 0.00                                                                              | 0.04                                                                              | 0.03                                                                                | 0.74                                                                                | 0.74                                                                                | 0.00                                                                                | 0.71                                                                                | 0.71                                                                                |  |  |  |  |  |  |
| Sat Flow, veh/h              | 1399                                                                              | 0                                                                                 | 1572                                                                              | 598                                                                               | 50                                                                                | 777                                                                               | 1767                                                                                | 3511                                                                                | 91                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |  |  |  |  |  |  |
| Grp Volume(v), veh/h         | 24                                                                                | 0                                                                                 | 8                                                                                 | 11                                                                                | 0                                                                                 | 0                                                                                 | 30                                                                                  | 524                                                                                 | 546                                                                                 | 1                                                                                   | 585                                                                                 | 55                                                                                  |  |  |  |  |  |  |
| Grp Sat Flow(s),veh/h/ln     | 1399                                                                              | 0                                                                                 | 1572                                                                              | 1424                                                                              | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1839                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |  |  |  |  |  |  |
| Q Serve(g_s), s              | 0.3                                                                               | 0.0                                                                               | 0.3                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 1.0                                                                                 | 6.8                                                                                 | 6.8                                                                                 | 0.0                                                                                 | 3.6                                                                                 | 0.7                                                                                 |  |  |  |  |  |  |
| Cycle Q Clear(g_c), s        | 0.9                                                                               | 0.0                                                                               | 0.3                                                                               | 0.6                                                                               | 0.0                                                                               | 0.0                                                                               | 1.0                                                                                 | 6.8                                                                                 | 6.8                                                                                 | 0.0                                                                                 | 3.6                                                                                 | 0.7                                                                                 |  |  |  |  |  |  |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.45                                                                              |                                                                                   | 0.55                                                                              | 1.00                                                                                |                                                                                     | 0.05                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |  |  |  |  |  |  |
| Lane Grp Cap(c), veh/h       | 179                                                                               | 0                                                                                 | 66                                                                                | 145                                                                               | 0                                                                                 | 0                                                                                 | 58                                                                                  | 1300                                                                                | 1356                                                                                | 3                                                                                   | 2489                                                                                | 1110                                                                                |  |  |  |  |  |  |
| V/C Ratio(X)                 | 0.13                                                                              | 0.00                                                                              | 0.12                                                                              | 0.08                                                                              | 0.00                                                                              | 0.00                                                                              | 0.52                                                                                | 0.40                                                                                | 0.40                                                                                | 0.35                                                                                | 0.24                                                                                | 0.05                                                                                |  |  |  |  |  |  |
| Avail Cap(c_a), veh/h        | 722                                                                               | 0                                                                                 | 676                                                                               | 722                                                                               | 0                                                                                 | 0                                                                                 | 186                                                                                 | 1300                                                                                | 1356                                                                                | 158                                                                                 | 2489                                                                                | 1110                                                                                |  |  |  |  |  |  |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |  |  |  |  |  |  |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |  |  |  |  |  |  |
| Uniform Delay (d), s/veh     | 28.7                                                                              | 0.0                                                                               | 28.4                                                                              | 28.5                                                                              | 0.0                                                                               | 0.0                                                                               | 29.3                                                                                | 3.0                                                                                 | 3.0                                                                                 | 30.7                                                                                | 3.2                                                                                 | 2.8                                                                                 |  |  |  |  |  |  |
| Incr Delay (d2), s/veh       | 0.3                                                                               | 0.0                                                                               | 0.8                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 7.1                                                                                 | 0.9                                                                                 | 0.9                                                                                 | 60.2                                                                                | 0.2                                                                                 | 0.1                                                                                 |  |  |  |  |  |  |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |  |  |  |  |  |  |
| %ile BackOfQ(50%),veh/ln     | 0.3                                                                               | 0.0                                                                               | 0.1                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 0.5                                                                                 | 1.5                                                                                 | 1.6                                                                                 | 0.1                                                                                 | 0.8                                                                                 | 0.1                                                                                 |  |  |  |  |  |  |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh         | 29.0                                                                              | 0.0                                                                               | 29.2                                                                              | 28.7                                                                              | 0.0                                                                               | 0.0                                                                               | 36.4                                                                                | 4.0                                                                                 | 3.9                                                                                 | 90.9                                                                                | 3.4                                                                                 | 2.8                                                                                 |  |  |  |  |  |  |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | D                                                                                   | A                                                                                   | A                                                                                   | F                                                                                   | A                                                                                   | A                                                                                   |  |  |  |  |  |  |
| Approach Vol, veh/h          | 32                                                                                |                                                                                   |                                                                                   | 11                                                                                |                                                                                   |                                                                                   | 1100                                                                                |                                                                                     |                                                                                     | 641                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Approach Delay, s/veh        | 29.0                                                                              |                                                                                   |                                                                                   | 28.7                                                                              |                                                                                   |                                                                                   | 4.8                                                                                 |                                                                                     |                                                                                     | 3.5                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Phs Duration (G+Y+Rc), s     | 4.6                                                                               | 49.9                                                                              | 7.1                                                                               |                                                                                   | 6.5                                                                               | 48.0                                                                              | 7.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Max Green Setting (Gmax), s  | 5.5                                                                               | 44.5                                                                              | 26.5                                                                              |                                                                                   | 6.5                                                                               | 43.5                                                                              | 26.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Max Q Clear Time (g_c+I1), s | 2.0                                                                               | 8.8                                                                               | 2.9                                                                               |                                                                                   | 3.0                                                                               | 5.6                                                                               | 2.6                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| Green Ext Time (p_c), s      | 0.0                                                                               | 8.7                                                                               | 0.1                                                                               |                                                                                   | 0.0                                                                               | 4.7                                                                               | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| HCM 6th Ctrl Delay           | 4.9                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |
| HCM 6th LOS                  | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |

# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |                                                                                   |                                                                                   |  |  |  |  |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 0                                                                                 | 0                                                                                 | 0                                                                                 | 118                                                                               | 16                                                                                | 218                                                                               | 52                                                                                  | 736                                                                                 | 0                                                                                   | 0                                                                                   | 381                                                                                 | 163                                                                                 |
| Future Volume (veh/h)        | 0                                                                                 | 0                                                                                 | 0                                                                                 | 118                                                                               | 16                                                                                | 218                                                                               | 52                                                                                  | 736                                                                                 | 0                                                                                   | 0                                                                                   | 381                                                                                 | 163                                                                                 |
| Initial Q (Qb), veh          |                                                                                   |                                                                                   |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                   |                                                                                   |                                                                                   | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                   |                                                                                   |                                                                                   | 137                                                                               | 19                                                                                | 253                                                                               | 60                                                                                  | 856                                                                                 | 0                                                                                   | 0                                                                                   | 443                                                                                 | 190                                                                                 |
| Peak Hour Factor             |                                                                                   |                                                                                   |                                                                                   | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                |
| Percent Heavy Veh, %         |                                                                                   |                                                                                   |                                                                                   | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                   |                                                                                   |                                                                                   | 357                                                                               | 374                                                                               | 317                                                                               | 89                                                                                  | 2341                                                                                | 0                                                                                   | 0                                                                                   | 1927                                                                                | 859                                                                                 |
| Arrive On Green              |                                                                                   |                                                                                   |                                                                                   | 0.20                                                                              | 0.20                                                                              | 0.20                                                                              | 0.05                                                                                | 0.66                                                                                | 0.00                                                                                | 0.00                                                                                | 0.55                                                                                | 0.55                                                                                |
| Sat Flow, veh/h              |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                   |                                                                                   |                                                                                   | 137                                                                               | 19                                                                                | 253                                                                               | 60                                                                                  | 856                                                                                 | 0                                                                                   | 0                                                                                   | 443                                                                                 | 190                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                   |                                                                                   |                                                                                   | 4.5                                                                               | 0.6                                                                               | 10.3                                                                              | 2.2                                                                                 | 7.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.4                                                                                 | 4.2                                                                                 |
| Cycle Q Clear(g_c), s        |                                                                                   |                                                                                   |                                                                                   | 4.5                                                                               | 0.6                                                                               | 10.3                                                                              | 2.2                                                                                 | 7.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.4                                                                                 | 4.2                                                                                 |
| Prop In Lane                 |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                   |                                                                                   |                                                                                   | 357                                                                               | 374                                                                               | 317                                                                               | 89                                                                                  | 2341                                                                                | 0                                                                                   | 0                                                                                   | 1927                                                                                | 859                                                                                 |
| V/C Ratio(X)                 |                                                                                   |                                                                                   |                                                                                   | 0.38                                                                              | 0.05                                                                              | 0.80                                                                              | 0.68                                                                                | 0.37                                                                                | 0.00                                                                                | 0.00                                                                                | 0.23                                                                                | 0.22                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                   |                                                                                   |                                                                                   | 962                                                                               | 1010                                                                              | 856                                                                               | 330                                                                                 | 2341                                                                                | 0                                                                                   | 0                                                                                   | 1927                                                                                | 859                                                                                 |
| HCM Platoon Ratio            |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                   |                                                                                   |                                                                                   | 23.1                                                                              | 21.6                                                                              | 25.4                                                                              | 31.3                                                                                | 5.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 7.9                                                                                 | 7.8                                                                                 |
| Incr Delay (d2), s/veh       |                                                                                   |                                                                                   |                                                                                   | 0.7                                                                               | 0.1                                                                               | 4.6                                                                               | 8.7                                                                                 | 0.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.3                                                                                 | 0.6                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                   |                                                                                   |                                                                                   | 1.7                                                                               | 0.2                                                                               | 3.8                                                                               | 1.1                                                                                 | 2.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 1.4                                                                                 | 1.3                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                   |                                                                                   |                                                                                   | 23.8                                                                              | 21.6                                                                              | 30.0                                                                              | 40.0                                                                                | 5.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 8.2                                                                                 | 8.4                                                                                 |
| LnGrp LOS                    |                                                                                   |                                                                                   |                                                                                   | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 409                                                                               |                                                                                   |                                                                                     | 916                                                                                 |                                                                                     |                                                                                     | 633                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 27.6                                                                              |                                                                                   |                                                                                     | 7.7                                                                                 |                                                                                     |                                                                                     | 8.2                                                                                 |                                                                                     |
| Approach LOS                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| Timer - Assigned Phs         |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 49.0                                                                              |                                                                                   |                                                                                   | 7.9                                                                               | 41.1                                                                              |                                                                                     | 18.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                   | 44.5                                                                              |                                                                                   |                                                                                   | 12.5                                                                              | 27.5                                                                              |                                                                                     | 36.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 9.2                                                                               |                                                                                   |                                                                                   | 4.2                                                                               | 6.4                                                                               |                                                                                     | 12.3                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                   | 7.2                                                                               |                                                                                   |                                                                                   | 0.1                                                                               | 3.4                                                                               |                                                                                     | 1.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   |                                                                                   | 12.0                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |                                                                                     |
| Traffic Volume (veh/h)       | 241                                                                               | 140                                                                               | 85                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 549                                                                                 | 134                                                                                 | 82                                                                                  | 420                                                                                 | 0                                                                                   |
| Future Volume (veh/h)        | 241                                                                               | 140                                                                               | 85                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 549                                                                                 | 134                                                                                 | 82                                                                                  | 420                                                                                 | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 301                                                                               | 175                                                                               | 106                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 686                                                                                 | 168                                                                                 | 102                                                                                 | 525                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.80                                                                              | 0.80                                                                              | 0.80                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.80                                                                               | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 354                                                                               | 206                                                                               | 489                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1541                                                                                | 687                                                                                 | 132                                                                                 | 2012                                                                                | 0                                                                                   |
| Arrive On Green              | 0.31                                                                              | 0.31                                                                              | 0.31                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.44                                                                                | 0.44                                                                                | 0.07                                                                                | 0.57                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 1137                                                                              | 661                                                                               | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 476                                                                               | 0                                                                                 | 106                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 686                                                                                 | 168                                                                                 | 102                                                                                 | 525                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1799                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 18.9                                                                              | 0.0                                                                               | 3.8                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 10.4                                                                                | 5.1                                                                                 | 4.3                                                                                 | 5.7                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 18.9                                                                              | 0.0                                                                               | 3.8                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 10.4                                                                                | 5.1                                                                                 | 4.3                                                                                 | 5.7                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 0.63                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 560                                                                               | 0                                                                                 | 489                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1541                                                                                | 687                                                                                 | 132                                                                                 | 2012                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 0.85                                                                              | 0.00                                                                              | 0.22                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.45                                                                                | 0.24                                                                                | 0.78                                                                                | 0.26                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 885                                                                               | 0                                                                                 | 774                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1541                                                                                | 687                                                                                 | 276                                                                                 | 2012                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 24.6                                                                              | 0.0                                                                               | 19.4                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 15.0                                                                                | 13.5                                                                                | 34.6                                                                                | 8.3                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 4.7                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.9                                                                                 | 0.8                                                                                 | 9.3                                                                                 | 0.3                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 7.9                                                                               | 0.0                                                                               | 1.3                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 3.8                                                                                 | 1.8                                                                                 | 2.1                                                                                 | 2.0                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 29.3                                                                              | 0.0                                                                               | 19.6                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 15.9                                                                                | 14.4                                                                                | 44.0                                                                                | 8.6                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 582                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 854                                                                                |                                                                                     |                                                                                     | 627                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 27.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 15.6                                                                               |                                                                                     |                                                                                     | 14.3                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.2                                                                              | 37.8                                                                              | 28.2                                                                              |                                                                                   | 48.0                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 11.9                                                                              | 27.1                                                                              | 37.5                                                                              |                                                                                   | 43.5                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 6.3                                                                               | 12.4                                                                              | 20.9                                                                              |                                                                                   | 7.7                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 4.4                                                                               | 2.8                                                                               |                                                                                   | 4.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 18.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

10/31/2020

| Intersection              |     |
|---------------------------|-----|
| Intersection Delay, s/veh | 9.9 |
| Intersection LOS          | A   |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 82                                                                                | 117                                                                               | 16   | 18                                                                                | 144                                                                               | 31   | 22   | 56                                                                                  | 14   | 22   | 30                                                                                  | 33   |
| Future Vol, veh/h   | 82                                                                                | 117                                                                               | 16   | 18                                                                                | 144                                                                               | 31   | 22   | 56                                                                                  | 14   | 22   | 30                                                                                  | 33   |
| Peak Hour Factor    | 0.79                                                                              | 0.79                                                                              | 0.79 | 0.79                                                                              | 0.79                                                                              | 0.79 | 0.79 | 0.79                                                                                | 0.79 | 0.79 | 0.79                                                                                | 0.79 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 104                                                                               | 148                                                                               | 20   | 23                                                                                | 182                                                                               | 39   | 28   | 71                                                                                  | 18   | 28   | 38                                                                                  | 42   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB  | WB   | NB  | SB  |
|----------------------------|-----|------|-----|-----|
| Opposing Approach          | WB  | EB   | SB  | NB  |
| Opposing Lanes             | 2   | 2    | 1   | 1   |
| Conflicting Approach Left  | SB  | NB   | EB  | WB  |
| Conflicting Lanes Left     | 1   | 1    | 2   | 2   |
| Conflicting Approach Right | NB  | SB   | WB  | EB  |
| Conflicting Lanes Right    | 1   | 1    | 2   | 2   |
| HCM Control Delay          | 9.8 | 10.5 | 9.5 | 9.3 |
| HCM LOS                    | A   | B    | A   | A   |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 24%   | 100%  | 0%    | 100%  | 0%    | 26%   |
| Vol Thru, %            | 61%   | 0%    | 88%   | 0%    | 82%   | 35%   |
| Vol Right, %           | 15%   | 0%    | 12%   | 0%    | 18%   | 39%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 92    | 82    | 133   | 18    | 175   | 85    |
| LT Vol                 | 22    | 82    | 0     | 18    | 0     | 22    |
| Through Vol            | 56    | 0     | 117   | 0     | 144   | 30    |
| RT Vol                 | 14    | 0     | 16    | 0     | 31    | 33    |
| Lane Flow Rate         | 116   | 104   | 168   | 23    | 222   | 108   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.172 | 0.17  | 0.248 | 0.038 | 0.326 | 0.156 |
| Departure Headway (Hd) | 5.329 | 5.888 | 5.298 | 5.931 | 5.302 | 5.21  |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 666   | 604   | 672   | 599   | 671   | 681   |
| Service Time           | 3.419 | 3.673 | 3.083 | 3.718 | 3.088 | 3.301 |
| HCM Lane V/C Ratio     | 0.174 | 0.172 | 0.25  | 0.038 | 0.331 | 0.159 |
| HCM Control Delay      | 9.5   | 9.9   | 9.8   | 9     | 10.7  | 9.3   |
| HCM Lane LOS           | A     | A     | A     | A     | B     | A     |
| HCM 95th-tile Q        | 0.6   | 0.6   | 1     | 0.1   | 1.4   | 0.6   |

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

10/31/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 5.4  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↰    |      |      | ↰    | ↰↰↰  |      |      | ↰↰↰  |      |      |
| Traffic Vol, veh/h       | 0    | 0    | 165  | 0    | 0    | 98   | 0    | 1702 | 29   | 36   | 1769 | 161  |
| Future Vol, veh/h        | 0    | 0    | 165  | 0    | 0    | 98   | 0    | 1702 | 29   | 36   | 1769 | 161  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | -    | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 179  | 0    | 0    | 107  | 0    | 1850 | 32   | 39   | 1923 | 175  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |      |
|----------------------|--------|---|--------|---|--------|------|--------|------|
| Conflicting Flow All | -      | - | 1049   | - | -      | 941  | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16 | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93 | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | 191    | 0 | 0      | 226  | 0      | 142  |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | 191    | - | -      | 226  | -      | 142  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |

| Approach             | EB    | WB   | NB | SB  |
|----------------------|-------|------|----|-----|
| HCM Control Delay, s | 100.4 | 34.4 | 0  | 0.7 |
| HCM LOS              | F     | D    |    |     |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | -   | -   | 191        | 226   | 142   | -   |
| HCM Lane V/C Ratio    | -   | -   | 0.939      | 0.471 | 0.276 | -   |
| HCM Control Delay (s) | -   | -   | 100.4      | 34.4  | 39.7  | -   |
| HCM Lane LOS          | -   | -   | F          | D     | E     | -   |
| HCM 95th %tile Q(veh) | -   | -   | 7.5        | 2.3   | 1.1   | -   |



HCM 6th TWSC  
6: Campus Dr & 6th Street

10/31/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 7.7  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      |      | ↕    |      |      | ↕    |      |
| Traffic Vol, veh/h       | 12   | 8    | 0    | 0    | 4    | 69   | 0    | 1    | 0    | 61   | 1    | 14   |
| Future Vol, veh/h        | 12   | 8    | 0    | 0    | 4    | 69   | 0    | 1    | 0    | 61   | 1    | 14   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 15   | 10   | 0    | 0    | 5    | 88   | 0    | 1    | 0    | 78   | 1    | 18   |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 214    | 167   | 10     | 172   | 176    | 1     | 19     | 0 | 0 | 1     | 0 | 0 |
| Stage 1              | 166    | 166   | -      | 1     | 1      | -     | -      | - | - | -     | - | - |
| Stage 2              | 48     | 1     | -      | 171   | 175    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.13   | 6.53  | 6.23   | 7.13  | 6.53   | 6.23  | 4.13   | - | - | 4.13  | - | - |
| Critical Hdwy Stg 1  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.527  | 4.027 | 3.327  | 3.527 | 4.027  | 3.327 | 2.227  | - | - | 2.227 | - | - |
| Pot Cap-1 Maneuver   | 741    | 724   | 1068   | 789   | 716    | 1081  | 1591   | - | - | 1615  | - | - |
| Stage 1              | 834    | 759   | -      | 1019  | 893    | -     | -      | - | - | -     | - | - |
| Stage 2              | 963    | 893   | -      | 829   | 752    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 651    | 689   | 1068   | 751   | 681    | 1081  | 1591   | - | - | 1615  | - | - |
| Mov Cap-2 Maneuver   | 651    | 689   | -      | 751   | 681    | -     | -      | - | - | -     | - | - |
| Stage 1              | 834    | 722   | -      | 1019  | 893    | -     | -      | - | - | -     | - | - |
| Stage 2              | 879    | 893   | -      | 777   | 715    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB  |  | NB |  | SB  |  |
|----------------------|------|--|-----|--|----|--|-----|--|
| HCM Control Delay, s | 10.6 |  | 8.8 |  | 0  |  | 5.9 |  |
| HCM LOS              | B    |  | A   |  |    |  |     |  |

| Minor Lane/Major Mvmt | NBL  | NBT | NBR | EBLn1WBLn1  | SBL   | SBT | SBR |
|-----------------------|------|-----|-----|-------------|-------|-----|-----|
| Capacity (veh/h)      | 1591 | -   | -   | 666 1047    | 1615  | -   | -   |
| HCM Lane V/C Ratio    | -    | -   | -   | 0.039 0.089 | 0.048 | -   | -   |
| HCM Control Delay (s) | 0    | -   | -   | 10.6 8.8    | 7.3   | 0   | -   |
| HCM Lane LOS          | A    | -   | -   | B A         | A     | A   | -   |
| HCM 95th %tile Q(veh) | 0    | -   | -   | 0.1 0.3     | 0.2   | -   | -   |

| Intersection             |        |      |        |            |        |       |        |      |      |      |      |      |
|--------------------------|--------|------|--------|------------|--------|-------|--------|------|------|------|------|------|
| Int Delay, s/veh         | 2.4    |      |        |            |        |       |        |      |      |      |      |      |
| Movement                 | EBL    | EBT  | EBR    | WBL        | WBT    | WBR   | NBL    | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |        |      | ↗      |            |        | ↗     | ↗      | ↗↘   |      | ↗    | ↗↘   |      |
| Traffic Vol, veh/h       | 0      | 0    | 68     | 0          | 0      | 161   | 98     | 1022 | 105  | 107  | 1086 | 8    |
| Future Vol, veh/h        | 0      | 0    | 68     | 0          | 0      | 161   | 98     | 1022 | 105  | 107  | 1086 | 8    |
| Conflicting Peds, #/hr   | 0      | 0    | 0      | 0          | 0      | 0     | 0      | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop   | Stop | Stop   | Stop       | Stop   | Stop  | Free   | Free | Free | Free | Free | Free |
| RT Channelized           | -      | -    | None   | -          | -      | None  | -      | -    | None | -    | -    | None |
| Storage Length           | -      | -    | 0      | -          | -      | 0     | 75     | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -      | 0    | -      | -          | 0      | -     | -      | 0    | -    | -    | 0    | -    |
| Grade, %                 | -      | 0    | -      | -          | 0      | -     | -      | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 97     | 97   | 97     | 97         | 97     | 97    | 97     | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %        | 3      | 3    | 3      | 3          | 3      | 3     | 3      | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0      | 0    | 70     | 0          | 0      | 166   | 101    | 1054 | 108  | 110  | 1120 | 8    |
|                          |        |      |        |            |        |       |        |      |      |      |      |      |
| Major/Minor              | Minor2 |      | Minor1 |            | Major1 |       | Major2 |      |      |      |      |      |
| Conflicting Flow All     | -      | -    | 564    | -          | -      | 581   | 1128   | 0    | 0    | 1162 | 0    | 0    |
| Stage 1                  | -      | -    | -      | -          | -      | -     | -      | -    | -    | -    | -    | -    |
| Stage 2                  | -      | -    | -      | -          | -      | -     | -      | -    | -    | -    | -    | -    |
| Critical Hdwy            | -      | -    | 6.96   | -          | -      | 6.96  | 4.16   | -    | -    | 4.16 | -    | -    |
| Critical Hdwy Stg 1      | -      | -    | -      | -          | -      | -     | -      | -    | -    | -    | -    | -    |
| Critical Hdwy Stg 2      | -      | -    | -      | -          | -      | -     | -      | -    | -    | -    | -    | -    |
| Follow-up Hdwy           | -      | -    | 3.33   | -          | -      | 3.33  | 2.23   | -    | -    | 2.23 | -    | -    |
| Pot Cap-1 Maneuver       | 0      | 0    | 466    | 0          | 0      | 454   | 609    | -    | -    | 591  | -    | -    |
| Stage 1                  | 0      | 0    | -      | 0          | 0      | -     | -      | -    | -    | -    | -    | -    |
| Stage 2                  | 0      | 0    | -      | 0          | 0      | -     | -      | -    | -    | -    | -    | -    |
| Platoon blocked, %       |        |      |        |            |        |       |        | -    | -    |      | -    | -    |
| Mov Cap-1 Maneuver       | -      | -    | 466    | -          | -      | 454   | 609    | -    | -    | 591  | -    | -    |
| Mov Cap-2 Maneuver       | -      | -    | -      | -          | -      | -     | -      | -    | -    | -    | -    | -    |
| Stage 1                  | -      | -    | -      | -          | -      | -     | -      | -    | -    | -    | -    | -    |
| Stage 2                  | -      | -    | -      | -          | -      | -     | -      | -    | -    | -    | -    | -    |
|                          |        |      |        |            |        |       |        |      |      |      |      |      |
|                          |        |      |        |            |        |       |        |      |      |      |      |      |
| Approach                 | EB     |      | WB     |            | NB     |       | SB     |      |      |      |      |      |
| HCM Control Delay, s     | 14.1   |      | 17.4   |            | 1      |       | 1.1    |      |      |      |      |      |
| HCM LOS                  | B      |      | C      |            |        |       |        |      |      |      |      |      |
|                          |        |      |        |            |        |       |        |      |      |      |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT  | NBR    | EBLn1WBLn1 | SBL    | SBT   | SBR    |      |      |      |      |      |
| Capacity (veh/h)         | 609    | -    | -      | 466        | 454    | 591   | -      | -    |      |      |      |      |
| HCM Lane V/C Ratio       | 0.166  | -    | -      | 0.15       | 0.366  | 0.187 | -      | -    |      |      |      |      |
| HCM Control Delay (s)    | 12.1   | -    | -      | 14.1       | 17.4   | 12.5  | -      | -    |      |      |      |      |
| HCM Lane LOS             | B      | -    | -      | B          | C      | B     | -      | -    |      |      |      |      |
| HCM 95th %tile Q(veh)    | 0.6    | -    | -      | 0.5        | 1.7    | 0.7   | -      | -    |      |      |      |      |

# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 143                                                                               | 540                                                                               | 46                                                                                | 1195                                                                              | 0                                                                                 | 0                                                                                 | 1283                                                                                | 657                                                                                 | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 143                                                                               | 540                                                                               | 46                                                                                | 1195                                                                              | 0                                                                                 | 0                                                                                 | 1283                                                                                | 657                                                                                 | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 155                                                                               | 587                                                                               | 50                                                                                | 1299                                                                              | 0                                                                                 | 0                                                                                 | 1395                                                                                | 714                                                                                 |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 391                                                                               | 696                                                                               | 72                                                                                | 2373                                                                              | 0                                                                                 | 0                                                                                 | 2044                                                                                | 912                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.22                                                                              | 0.22                                                                              | 0.04                                                                              | 0.67                                                                              | 0.00                                                                              | 0.00                                                                              | 0.58                                                                                | 0.58                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 155                                                                               | 587                                                                               | 50                                                                                | 1299                                                                              | 0                                                                                 | 0                                                                                 | 1395                                                                                | 714                                                                                 |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 6.4                                                                               | 15.3                                                                              | 2.4                                                                               | 16.3                                                                              | 0.0                                                                               | 0.0                                                                               | 23.5                                                                                | 29.8                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 6.4                                                                               | 15.3                                                                              | 2.4                                                                               | 16.3                                                                              | 0.0                                                                               | 0.0                                                                               | 23.5                                                                                | 29.8                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 391                                                                               | 696                                                                               | 72                                                                                | 2373                                                                              | 0                                                                                 | 0                                                                                 | 2044                                                                                | 912                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.40                                                                              | 0.84                                                                              | 0.70                                                                              | 0.55                                                                              | 0.00                                                                              | 0.00                                                                              | 0.68                                                                                | 0.78                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 486                                                                               | 865                                                                               | 114                                                                               | 2373                                                                              | 0                                                                                 | 0                                                                                 | 2044                                                                                | 912                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 28.4                                                                              | 31.8                                                                              | 40.4                                                                              | 7.2                                                                               | 0.0                                                                               | 0.0                                                                               | 12.5                                                                                | 13.8                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 0.7                                                                               | 6.3                                                                               | 11.4                                                                              | 0.9                                                                               | 0.0                                                                               | 0.0                                                                               | 1.9                                                                                 | 6.7                                                                                 |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 2.6                                                                               | 6.0                                                                               | 1.2                                                                               | 4.8                                                                               | 0.0                                                                               | 0.0                                                                               | 8.2                                                                                 | 10.3                                                                                |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 29.0                                                                              | 38.1                                                                              | 51.9                                                                              | 8.1                                                                               | 0.0                                                                               | 0.0                                                                               | 14.3                                                                                | 20.5                                                                                |                                                                                     |                                                                                     |
| LnGrp LOS                    | C                                                                                 | D                                                                                 | D                                                                                 | A                                                                                 | A                                                                                 | A                                                                                 | B                                                                                   | C                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 742                                                                               |                                                                                   |                                                                                   | 1349                                                                              |                                                                                   |                                                                                   | 2109                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 36.2                                                                              |                                                                                   |                                                                                   | 9.8                                                                               |                                                                                   |                                                                                   | 16.4                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 | 8                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 62.0                                                                              |                                                                                   | 8.0                                                                               |                                                                                   | 54.0                                                                              | 23.4                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 57.5                                                                              |                                                                                   | 5.5                                                                               |                                                                                   | 47.5                                                                              | 23.5                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 18.3                                                                              |                                                                                   | 4.4                                                                               |                                                                                   | 31.8                                                                              | 17.3                                                                              |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 12.1                                                                              |                                                                                   | 0.0                                                                               |                                                                                   | 10.9                                                                              | 1.6                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 17.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 3: 12th Avenue & SR 198 EB Off Ramps

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 571                                                                               | 0                                                                                 | 49                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 660                                                                                 | 143                                                                                 | 0                                                                                   | 881                                                                                 | 554                                                                                 |
| Future Volume (veh/h)        | 571                                                                               | 0                                                                                 | 49                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 660                                                                                 | 143                                                                                 | 0                                                                                   | 881                                                                                 | 554                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 614                                                                               | 0                                                                                 | 53                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 710                                                                                 | 0                                                                                   | 0                                                                                   | 947                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.93                                                                              | 0.93                                                                              | 0.93                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.93                                                                               | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 767                                                                               | 0                                                                                 | 352                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2323                                                                                |                                                                                     | 0                                                                                   | 2323                                                                                |                                                                                     |
| Arrive On Green              | 0.22                                                                              | 0.00                                                                              | 0.22                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.66                                                                                | 0.00                                                                                | 0.00                                                                                | 0.66                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 614                                                                               | 0                                                                                 | 53                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 710                                                                                 | 0                                                                                   | 0                                                                                   | 947                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 13.0                                                                              | 0.0                                                                               | 2.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 9.6                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 13.0                                                                              | 0.0                                                                               | 2.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 9.6                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 767                                                                               | 0                                                                                 | 352                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2323                                                                                |                                                                                     | 0                                                                                   | 2323                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.80                                                                              | 0.00                                                                              | 0.15                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.31                                                                                |                                                                                     | 0.00                                                                                | 0.41                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1364                                                                              | 0                                                                                 | 626                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2323                                                                                |                                                                                     | 0                                                                                   | 2323                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 28.1                                                                              | 0.0                                                                               | 23.9                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 5.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.1                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.3                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.5                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 5.0                                                                               | 0.0                                                                               | 0.7                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 1.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.7                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.1                                                                              | 0.0                                                                               | 24.1                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 5.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.6                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 667                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 710                                                                                |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 5.9                                                                                |                                                                                     |                                                                                     | 6.6                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                  |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 55.0                                                                              |                                                                                   |                                                                                   | 21.6                                                                              |                                                                                   |                                                                                   | 55.0                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 50.5                                                                              |                                                                                   |                                                                                   | 30.5                                                                              |                                                                                   |                                                                                   | 50.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 8.6                                                                               |                                                                                   |                                                                                   | 15.0                                                                              |                                                                                   |                                                                                   | 11.6                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 5.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 7.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 13.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 30                                                                                | 740                                                                               | 33                                                                                | 52                                                                                | 820                                                                               | 43                                                                                | 36                                                                                  | 68                                                                                  | 118                                                                                 | 100                                                                                 | 86                                                                                  | 34                                                                                  |
| Future Volume (veh/h)        | 30                                                                                | 740                                                                               | 33                                                                                | 52                                                                                | 820                                                                               | 43                                                                                | 36                                                                                  | 68                                                                                  | 118                                                                                 | 100                                                                                 | 86                                                                                  | 34                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 34                                                                                | 851                                                                               | 38                                                                                | 60                                                                                | 943                                                                               | 49                                                                                | 41                                                                                  | 78                                                                                  | 136                                                                                 | 115                                                                                 | 99                                                                                  | 39                                                                                  |
| Peak Hour Factor             | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 59                                                                                | 1103                                                                              | 492                                                                               | 82                                                                                | 1149                                                                              | 513                                                                               | 66                                                                                  | 200                                                                                 | 349                                                                                 | 147                                                                                 | 696                                                                                 | 590                                                                                 |
| Arrive On Green              | 0.03                                                                              | 0.31                                                                              | 0.31                                                                              | 0.05                                                                              | 0.33                                                                              | 0.33                                                                              | 0.04                                                                                | 0.33                                                                                | 0.33                                                                                | 0.08                                                                                | 0.38                                                                                | 0.38                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                                | 607                                                                                 | 1058                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 34                                                                                | 851                                                                               | 38                                                                                | 60                                                                                | 943                                                                               | 49                                                                                | 41                                                                                  | 0                                                                                   | 214                                                                                 | 115                                                                                 | 99                                                                                  | 39                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                                | 0                                                                                   | 1665                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.5                                                                               | 17.3                                                                              | 1.3                                                                               | 2.6                                                                               | 19.4                                                                              | 1.7                                                                               | 1.8                                                                                 | 0.0                                                                                 | 7.8                                                                                 | 5.0                                                                                 | 2.8                                                                                 | 1.3                                                                                 |
| Cycle Q Clear(g_c), s        | 1.5                                                                               | 17.3                                                                              | 1.3                                                                               | 2.6                                                                               | 19.4                                                                              | 1.7                                                                               | 1.8                                                                                 | 0.0                                                                                 | 7.8                                                                                 | 5.0                                                                                 | 2.8                                                                                 | 1.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.64                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 59                                                                                | 1103                                                                              | 492                                                                               | 82                                                                                | 1149                                                                              | 513                                                                               | 66                                                                                  | 0                                                                                   | 549                                                                                 | 147                                                                                 | 696                                                                                 | 590                                                                                 |
| V/C Ratio(X)                 | 0.58                                                                              | 0.77                                                                              | 0.08                                                                              | 0.73                                                                              | 0.82                                                                              | 0.10                                                                              | 0.62                                                                                | 0.00                                                                                | 0.39                                                                                | 0.78                                                                                | 0.14                                                                                | 0.07                                                                                |
| Avail Cap(c_a), veh/h        | 123                                                                               | 1318                                                                              | 588                                                                               | 146                                                                               | 1363                                                                              | 608                                                                               | 143                                                                                 | 0                                                                                   | 549                                                                                 | 235                                                                                 | 696                                                                                 | 590                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 37.6                                                                              | 24.6                                                                              | 19.1                                                                              | 37.1                                                                              | 24.5                                                                              | 18.5                                                                              | 37.4                                                                                | 0.0                                                                                 | 20.3                                                                                | 35.5                                                                                | 16.3                                                                                | 15.8                                                                                |
| Incr Delay (d2), s/veh       | 8.7                                                                               | 2.4                                                                               | 0.1                                                                               | 11.8                                                                              | 3.6                                                                               | 0.1                                                                               | 9.0                                                                                 | 0.0                                                                                 | 2.1                                                                                 | 8.9                                                                                 | 0.4                                                                                 | 0.2                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.8                                                                               | 7.1                                                                               | 0.5                                                                               | 1.4                                                                               | 8.1                                                                               | 0.6                                                                               | 0.9                                                                                 | 0.0                                                                                 | 3.2                                                                                 | 2.5                                                                                 | 1.2                                                                                 | 0.5                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 46.3                                                                              | 26.9                                                                              | 19.2                                                                              | 49.0                                                                              | 28.0                                                                              | 18.6                                                                              | 46.4                                                                                | 0.0                                                                                 | 22.4                                                                                | 44.4                                                                                | 16.7                                                                                | 16.0                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                   | A                                                                                   | C                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   | 923                                                                               |                                                                                   |                                                                                   | 1052                                                                              |                                                                                   |                                                                                     | 255                                                                                 |                                                                                     |                                                                                     | 253                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   | 27.3                                                                              |                                                                                   |                                                                                   | 28.8                                                                              |                                                                                   |                                                                                     | 26.3                                                                                |                                                                                     |                                                                                     | 29.2                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 11.0                                                                              | 30.5                                                                              | 8.2                                                                               | 29.2                                                                              | 7.5                                                                               | 34.1                                                                              | 7.1                                                                                 | 30.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 10.5                                                                              | 25.5                                                                              | 6.5                                                                               | 29.5                                                                              | 6.4                                                                               | 29.6                                                                              | 5.5                                                                                 | 30.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 7.0                                                                               | 9.8                                                                               | 4.6                                                                               | 19.3                                                                              | 3.8                                                                               | 4.8                                                                               | 3.5                                                                                 | 21.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 1.1                                                                               | 0.0                                                                               | 4.2                                                                               | 0.0                                                                               | 0.6                                                                               | 0.0                                                                                 | 4.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 28.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 253                                                                               | 268                                                                               | 213                                                                               | 110                                                                               | 304                                                                               | 85                                                                                | 306                                                                                | 632                                                                                 | 57                                                                                  | 92                                                                                  | 552                                                                                 | 105                                                                                 |
| Future Volume (veh/h)        | 253                                                                               | 268                                                                               | 213                                                                               | 110                                                                               | 304                                                                               | 85                                                                                | 306                                                                                | 632                                                                                 | 57                                                                                  | 92                                                                                  | 552                                                                                 | 105                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 278                                                                               | 295                                                                               | 234                                                                               | 121                                                                               | 334                                                                               | 93                                                                                | 336                                                                                | 695                                                                                 | 63                                                                                  | 101                                                                                 | 607                                                                                 | 115                                                                                 |
| Peak Hour Factor             | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                               | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 362                                                                               | 679                                                                               | 303                                                                               | 154                                                                               | 476                                                                               | 131                                                                               | 421                                                                                | 1325                                                                                | 120                                                                                 | 129                                                                                 | 1254                                                                                | 560                                                                                 |
| Arrive On Green              | 0.11                                                                              | 0.19                                                                              | 0.19                                                                              | 0.09                                                                              | 0.17                                                                              | 0.17                                                                              | 0.12                                                                               | 0.41                                                                                | 0.41                                                                                | 0.07                                                                                | 0.36                                                                                | 0.36                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2733                                                                              | 750                                                                               | 3428                                                                               | 3269                                                                                | 296                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 278                                                                               | 295                                                                               | 234                                                                               | 121                                                                               | 214                                                                               | 213                                                                               | 336                                                                                | 375                                                                                 | 383                                                                                 | 101                                                                                 | 607                                                                                 | 115                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1721                                                                              | 1714                                                                               | 1763                                                                                | 1802                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 5.9                                                                               | 5.5                                                                               | 7.3                                                                               | 5.0                                                                               | 8.5                                                                               | 8.7                                                                               | 7.1                                                                                | 11.9                                                                                | 12.0                                                                                | 4.2                                                                                 | 10.0                                                                                | 3.8                                                                                 |
| Cycle Q Clear(g_c), s        | 5.9                                                                               | 5.5                                                                               | 7.3                                                                               | 5.0                                                                               | 8.5                                                                               | 8.7                                                                               | 7.1                                                                                | 11.9                                                                                | 12.0                                                                                | 4.2                                                                                 | 10.0                                                                                | 3.8                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.44                                                                              | 1.00                                                                               |                                                                                     | 0.16                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 362                                                                               | 679                                                                               | 303                                                                               | 154                                                                               | 307                                                                               | 299                                                                               | 421                                                                                | 715                                                                                 | 731                                                                                 | 129                                                                                 | 1254                                                                                | 560                                                                                 |
| V/C Ratio(X)                 | 0.77                                                                              | 0.43                                                                              | 0.77                                                                              | 0.79                                                                              | 0.70                                                                              | 0.71                                                                              | 0.80                                                                               | 0.52                                                                                | 0.52                                                                                | 0.78                                                                                | 0.48                                                                                | 0.21                                                                                |
| Avail Cap(c_a), veh/h        | 368                                                                               | 1264                                                                              | 564                                                                               | 221                                                                               | 663                                                                               | 647                                                                               | 437                                                                                | 715                                                                                 | 731                                                                                 | 202                                                                                 | 1254                                                                                | 560                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 32.4                                                                              | 26.5                                                                              | 13.9                                                                              | 33.3                                                                              | 28.9                                                                              | 29.0                                                                              | 31.8                                                                               | 16.7                                                                                | 16.7                                                                                | 33.9                                                                                | 18.7                                                                                | 16.7                                                                                |
| Incr Delay (d2), s/veh       | 9.3                                                                               | 0.4                                                                               | 4.2                                                                               | 11.3                                                                              | 2.8                                                                               | 3.1                                                                               | 9.7                                                                                | 2.7                                                                                 | 2.7                                                                                 | 9.8                                                                                 | 1.3                                                                                 | 0.8                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 2.8                                                                               | 2.2                                                                               | 3.9                                                                               | 2.5                                                                               | 3.6                                                                               | 3.7                                                                               | 3.4                                                                                | 4.9                                                                                 | 5.0                                                                                 | 2.1                                                                                 | 4.0                                                                                 | 1.4                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 41.7                                                                              | 26.9                                                                              | 18.1                                                                              | 44.6                                                                              | 31.8                                                                              | 32.1                                                                              | 41.5                                                                               | 19.5                                                                                | 19.4                                                                                | 43.7                                                                                | 20.0                                                                                | 17.5                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 807                                                                               |                                                                                   |                                                                                   | 548                                                                               |                                                                                   |                                                                                   | 1094                                                                               |                                                                                     |                                                                                     | 823                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.5                                                                              |                                                                                   |                                                                                   | 34.7                                                                              |                                                                                   |                                                                                   | 26.2                                                                               |                                                                                     |                                                                                     | 22.6                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.0                                                                              | 34.7                                                                              | 11.0                                                                              | 18.9                                                                              | 13.6                                                                              | 31.0                                                                              | 12.4                                                                               | 17.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.5                                                                               | 27.5                                                                              | 9.3                                                                               | 26.7                                                                              | 9.5                                                                               | 26.5                                                                              | 8.0                                                                                | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 6.2                                                                               | 14.0                                                                              | 7.0                                                                               | 9.3                                                                               | 9.1                                                                               | 12.0                                                                              | 7.9                                                                                | 10.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.9                                                                               | 0.1                                                                               | 2.4                                                                               | 0.1                                                                               | 3.8                                                                               | 0.0                                                                                | 2.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 27.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 8: 11th Avenue & 7th Street

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 67                                                                                | 176                                                                               | 219                                                                               | 163                                                                               | 162                                                                               | 109                                                                               | 167                                                                                 | 583                                                                                 | 115                                                                                 | 111                                                                                 | 552                                                                                 | 52                                                                                  |
| Future Volume (veh/h)        | 67                                                                                | 176                                                                               | 219                                                                               | 163                                                                               | 162                                                                               | 109                                                                               | 167                                                                                 | 583                                                                                 | 115                                                                                 | 111                                                                                 | 552                                                                                 | 52                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 74                                                                                | 193                                                                               | 241                                                                               | 179                                                                               | 178                                                                               | 120                                                                               | 184                                                                                 | 641                                                                                 | 126                                                                                 | 122                                                                                 | 607                                                                                 | 57                                                                                  |
| Peak Hour Factor             | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 175                                                                               | 348                                                                               | 311                                                                               | 216                                                                               | 554                                                                               | 354                                                                               | 221                                                                                 | 1277                                                                                | 569                                                                                 | 154                                                                                 | 1143                                                                                | 510                                                                                 |
| Arrive On Green              | 0.05                                                                              | 0.20                                                                              | 0.20                                                                              | 0.12                                                                              | 0.27                                                                              | 0.27                                                                              | 0.13                                                                                | 0.36                                                                                | 0.36                                                                                | 0.09                                                                                | 0.32                                                                                | 0.32                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 2063                                                                              | 1318                                                                              | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 74                                                                                | 193                                                                               | 241                                                                               | 179                                                                               | 151                                                                               | 147                                                                               | 184                                                                                 | 641                                                                                 | 126                                                                                 | 122                                                                                 | 607                                                                                 | 57                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1618                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.6                                                                               | 7.7                                                                               | 11.3                                                                              | 7.7                                                                               | 5.3                                                                               | 5.7                                                                               | 7.9                                                                                 | 11.1                                                                                | 2.7                                                                                 | 5.3                                                                                 | 11.0                                                                                | 2.0                                                                                 |
| Cycle Q Clear(g_c), s        | 1.6                                                                               | 7.7                                                                               | 11.3                                                                              | 7.7                                                                               | 5.3                                                                               | 5.7                                                                               | 7.9                                                                                 | 11.1                                                                                | 2.7                                                                                 | 5.3                                                                                 | 11.0                                                                                | 2.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.81                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 175                                                                               | 348                                                                               | 311                                                                               | 216                                                                               | 474                                                                               | 435                                                                               | 221                                                                                 | 1277                                                                                | 569                                                                                 | 154                                                                                 | 1143                                                                                | 510                                                                                 |
| V/C Ratio(X)                 | 0.42                                                                              | 0.55                                                                              | 0.78                                                                              | 0.83                                                                              | 0.32                                                                              | 0.34                                                                              | 0.83                                                                                | 0.50                                                                                | 0.22                                                                                | 0.79                                                                                | 0.53                                                                                | 0.11                                                                                |
| Avail Cap(c_a), veh/h        | 233                                                                               | 587                                                                               | 524                                                                               | 231                                                                               | 698                                                                               | 641                                                                               | 238                                                                                 | 1277                                                                                | 569                                                                                 | 213                                                                                 | 1143                                                                                | 510                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 35.9                                                                              | 28.2                                                                              | 29.7                                                                              | 33.5                                                                              | 22.8                                                                              | 23.0                                                                              | 33.3                                                                                | 19.4                                                                                | 6.8                                                                                 | 34.9                                                                                | 21.5                                                                                | 18.5                                                                                |
| Incr Delay (d2), s/veh       | 1.6                                                                               | 1.4                                                                               | 4.2                                                                               | 20.5                                                                              | 0.4                                                                               | 0.5                                                                               | 20.4                                                                                | 1.4                                                                                 | 0.9                                                                                 | 12.8                                                                                | 1.8                                                                                 | 0.4                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 3.2                                                                               | 4.4                                                                               | 4.5                                                                               | 2.2                                                                               | 2.2                                                                               | 4.5                                                                                 | 4.4                                                                                 | 1.6                                                                                 | 2.7                                                                                 | 4.5                                                                                 | 0.8                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 37.5                                                                              | 29.6                                                                              | 33.8                                                                              | 54.0                                                                              | 23.2                                                                              | 23.4                                                                              | 53.7                                                                                | 20.8                                                                                | 7.7                                                                                 | 47.7                                                                                | 23.3                                                                                | 18.9                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | C                                                                                   | A                                                                                   | D                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   | 508                                                                               |                                                                                   |                                                                                   | 477                                                                               |                                                                                   |                                                                                     | 951                                                                                 |                                                                                     |                                                                                     | 786                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   | 32.8                                                                              |                                                                                   |                                                                                   | 34.8                                                                              |                                                                                   |                                                                                     | 25.4                                                                                |                                                                                     |                                                                                     | 26.8                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 11.3                                                                              | 32.8                                                                              | 14.0                                                                              | 19.9                                                                              | 14.3                                                                              | 29.8                                                                              | 8.5                                                                                 | 25.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.4                                                                               | 26.4                                                                              | 10.2                                                                              | 26.0                                                                              | 10.5                                                                              | 25.3                                                                              | 5.3                                                                                 | 30.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 7.3                                                                               | 13.1                                                                              | 9.7                                                                               | 13.3                                                                              | 9.9                                                                               | 13.0                                                                              | 3.6                                                                                 | 7.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 3.9                                                                               | 0.0                                                                               | 2.1                                                                               | 0.0                                                                               | 3.3                                                                               | 0.0                                                                                 | 1.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 28.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

10/31/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 138                                                                               | 0                                                                                 | 43                                                                                | 10                                                                                | 0                                                                                 | 10                                                                                | 161                                                                                 | 1071                                                                                | 3                                                                                   | 8                                                                                   | 1013                                                                                | 122                                                                                 |
| Future Volume (veh/h)        | 138                                                                               | 0                                                                                 | 43                                                                                | 10                                                                                | 0                                                                                 | 10                                                                                | 161                                                                                 | 1071                                                                                | 3                                                                                   | 8                                                                                   | 1013                                                                                | 122                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 142                                                                               | 0                                                                                 | 44                                                                                | 10                                                                                | 0                                                                                 | 10                                                                                | 166                                                                                 | 1104                                                                                | 3                                                                                   | 8                                                                                   | 1044                                                                                | 126                                                                                 |
| Peak Hour Factor             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 290                                                                               | 0                                                                                 | 205                                                                               | 153                                                                               | 24                                                                                | 98                                                                                | 209                                                                                 | 2391                                                                                | 6                                                                                   | 18                                                                                  | 1956                                                                                | 872                                                                                 |
| Arrive On Green              | 0.13                                                                              | 0.00                                                                              | 0.13                                                                              | 0.13                                                                              | 0.00                                                                              | 0.13                                                                              | 0.12                                                                                | 0.66                                                                                | 0.66                                                                                | 0.01                                                                                | 0.55                                                                                | 0.55                                                                                |
| Sat Flow, veh/h              | 1394                                                                              | 0                                                                                 | 1572                                                                              | 572                                                                               | 182                                                                               | 753                                                                               | 1767                                                                                | 3607                                                                                | 10                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 142                                                                               | 0                                                                                 | 44                                                                                | 20                                                                                | 0                                                                                 | 0                                                                                 | 166                                                                                 | 540                                                                                 | 567                                                                                 | 8                                                                                   | 1044                                                                                | 126                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1394                                                                              | 0                                                                                 | 1572                                                                              | 1507                                                                              | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1854                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 5.9                                                                               | 0.0                                                                               | 1.7                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 6.3                                                                                 | 10.2                                                                                | 10.2                                                                                | 0.3                                                                                 | 12.9                                                                                | 2.7                                                                                 |
| Cycle Q Clear(g_c), s        | 6.6                                                                               | 0.0                                                                               | 1.7                                                                               | 0.7                                                                               | 0.0                                                                               | 0.0                                                                               | 6.3                                                                                 | 10.2                                                                                | 10.2                                                                                | 0.3                                                                                 | 12.9                                                                                | 2.7                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.50                                                                              |                                                                                   | 0.50                                                                              | 1.00                                                                                |                                                                                     | 0.01                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 290                                                                               | 0                                                                                 | 205                                                                               | 275                                                                               | 0                                                                                 | 0                                                                                 | 209                                                                                 | 1168                                                                                | 1229                                                                                | 18                                                                                  | 1956                                                                                | 872                                                                                 |
| V/C Ratio(X)                 | 0.49                                                                              | 0.00                                                                              | 0.21                                                                              | 0.07                                                                              | 0.00                                                                              | 0.00                                                                              | 0.79                                                                                | 0.46                                                                                | 0.46                                                                                | 0.44                                                                                | 0.53                                                                                | 0.14                                                                                |
| Avail Cap(c_a), veh/h        | 637                                                                               | 0                                                                                 | 596                                                                               | 636                                                                               | 0                                                                                 | 0                                                                                 | 373                                                                                 | 1168                                                                                | 1229                                                                                | 129                                                                                 | 1956                                                                                | 872                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 28.7                                                                              | 0.0                                                                               | 26.7                                                                              | 26.3                                                                              | 0.0                                                                               | 0.0                                                                               | 29.4                                                                                | 5.6                                                                                 | 5.6                                                                                 | 33.8                                                                                | 9.7                                                                                 | 7.4                                                                                 |
| Incr Delay (d2), s/veh       | 1.3                                                                               | 0.0                                                                               | 0.5                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 6.6                                                                                 | 1.3                                                                                 | 1.3                                                                                 | 15.7                                                                                | 1.0                                                                                 | 0.3                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 2.3                                                                               | 0.0                                                                               | 0.7                                                                               | 0.3                                                                               | 0.0                                                                               | 0.0                                                                               | 2.9                                                                                 | 3.2                                                                                 | 3.3                                                                                 | 0.2                                                                                 | 4.4                                                                                 | 0.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.0                                                                              | 0.0                                                                               | 27.2                                                                              | 26.4                                                                              | 0.0                                                                               | 0.0                                                                               | 36.1                                                                                | 6.9                                                                                 | 6.9                                                                                 | 49.5                                                                                | 10.7                                                                                | 7.7                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | D                                                                                   | A                                                                                   | A                                                                                   | D                                                                                   | B                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 186                                                                               |                                                                                   |                                                                                   | 20                                                                                |                                                                                   |                                                                                   | 1273                                                                                |                                                                                     |                                                                                     | 1178                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.4                                                                              |                                                                                   |                                                                                   | 26.4                                                                              |                                                                                   |                                                                                   | 10.7                                                                                |                                                                                     |                                                                                     | 10.7                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 5.2                                                                               | 50.0                                                                              | 13.4                                                                              |                                                                                   | 12.6                                                                              | 42.6                                                                              | 13.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.0                                                                               | 45.5                                                                              | 26.0                                                                              |                                                                                   | 14.5                                                                              | 36.0                                                                              | 26.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 2.3                                                                               | 12.2                                                                              | 8.6                                                                               |                                                                                   | 8.3                                                                               | 14.9                                                                              | 2.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 9.0                                                                               | 0.6                                                                               |                                                                                   | 0.2                                                                               | 8.4                                                                               | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 12.1                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

10/31/2020

|                              |  |      |     |      |      |      |      |      |      |      |      |      |
|------------------------------|------------------------------------------------------------------------------------|------|-----|------|------|------|------|------|------|------|------|------|
| Movement                     | EBL                                                                                | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          |                                                                                    |      |     | ↰    | ↱    | ↰    | ↰    | ↱    |      |      | ↱    | ↰    |
| Traffic Volume (veh/h)       | 0                                                                                  | 0    | 0   | 218  | 35   | 196  | 91   | 1032 | 0    | 0    | 874  | 277  |
| Future Volume (veh/h)        | 0                                                                                  | 0    | 0   | 218  | 35   | 196  | 91   | 1032 | 0    | 0    | 874  | 277  |
| Initial Q (Qb), veh          |                                                                                    |      |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          |                                                                                    |      |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |                                                                                    |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |                                                                                    |      |     | No   |      |      | No   |      |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       |                                                                                    |      |     | 1856 | 1856 | 1856 | 1856 | 1856 | 0    | 0    | 1856 | 1856 |
| Adj Flow Rate, veh/h         |                                                                                    |      |     | 229  | 37   | 206  | 96   | 1086 | 0    | 0    | 920  | 292  |
| Peak Hour Factor             |                                                                                    |      |     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         |                                                                                    |      |     | 3    | 3    | 3    | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                   |                                                                                    |      |     | 305  | 320  | 271  | 124  | 2476 | 0    | 0    | 2008 | 896  |
| Arrive On Green              |                                                                                    |      |     | 0.17 | 0.17 | 0.17 | 0.07 | 0.70 | 0.00 | 0.00 | 0.57 | 0.57 |
| Sat Flow, veh/h              |                                                                                    |      |     | 1767 | 1856 | 1572 | 1767 | 3618 | 0    | 0    | 3618 | 1572 |
| Grp Volume(v), veh/h         |                                                                                    |      |     | 229  | 37   | 206  | 96   | 1086 | 0    | 0    | 920  | 292  |
| Grp Sat Flow(s),veh/h/ln     |                                                                                    |      |     | 1767 | 1856 | 1572 | 1767 | 1763 | 0    | 0    | 1763 | 1572 |
| Q Serve(g_s), s              |                                                                                    |      |     | 8.9  | 1.2  | 9.0  | 3.8  | 9.5  | 0.0  | 0.0  | 10.9 | 7.1  |
| Cycle Q Clear(g_c), s        |                                                                                    |      |     | 8.9  | 1.2  | 9.0  | 3.8  | 9.5  | 0.0  | 0.0  | 10.9 | 7.1  |
| Prop In Lane                 |                                                                                    |      |     | 1.00 |      | 1.00 | 1.00 |      | 0.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |                                                                                    |      |     | 305  | 320  | 271  | 124  | 2476 | 0    | 0    | 2008 | 896  |
| V/C Ratio(X)                 |                                                                                    |      |     | 0.75 | 0.12 | 0.76 | 0.77 | 0.44 | 0.00 | 0.00 | 0.46 | 0.33 |
| Avail Cap(c_a), veh/h        |                                                                                    |      |     | 750  | 787  | 667  | 261  | 2476 | 0    | 0    | 2008 | 896  |
| HCM Platoon Ratio            |                                                                                    |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           |                                                                                    |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     |                                                                                    |      |     | 28.3 | 25.1 | 28.3 | 32.9 | 4.6  | 0.0  | 0.0  | 9.0  | 8.2  |
| Incr Delay (d2), s/veh       |                                                                                    |      |     | 3.7  | 0.2  | 4.4  | 9.8  | 0.6  | 0.0  | 0.0  | 0.8  | 1.0  |
| Initial Q Delay(d3),s/veh    |                                                                                    |      |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |                                                                                    |      |     | 3.7  | 0.5  | 3.4  | 1.9  | 2.6  | 0.0  | 0.0  | 3.6  | 2.2  |
| Unsig. Movement Delay, s/veh |                                                                                    |      |     |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         |                                                                                    |      |     | 32.0 | 25.3 | 32.7 | 42.7 | 5.2  | 0.0  | 0.0  | 9.8  | 9.1  |
| LnGrp LOS                    |                                                                                    |      |     | C    | C    | C    | D    | A    | A    | A    | A    | A    |
| Approach Vol, veh/h          |                                                                                    |      |     |      | 472  |      |      | 1182 |      |      | 1212 |      |
| Approach Delay, s/veh        |                                                                                    |      |     |      | 31.8 |      |      | 8.2  |      |      | 9.6  |      |
| Approach LOS                 |                                                                                    |      |     |      | C    |      |      | A    |      |      | A    |      |
| Timer - Assigned Phs         |                                                                                    | 2    |     |      | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |                                                                                    | 55.0 |     |      | 9.5  | 45.5 |      | 16.9 |      |      |      |      |
| Change Period (Y+Rc), s      |                                                                                    | 4.5  |     |      | 4.5  | 4.5  |      | 4.5  |      |      |      |      |
| Max Green Setting (Gmax), s  |                                                                                    | 50.5 |     |      | 10.6 | 35.4 |      | 30.5 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |                                                                                    | 11.5 |     |      | 5.8  | 12.9 |      | 11.0 |      |      |      |      |
| Green Ext Time (p_c), s      |                                                                                    | 10.2 |     |      | 0.1  | 7.9  |      | 1.4  |      |      |      |      |
| <b>Intersection Summary</b>  |                                                                                    |      |     |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |                                                                                    |      |     | 12.7 |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |                                                                                    |      |     | B    |      |      |      |      |      |      |      |      |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

10/31/2020

|                              |  |      |      |      |     |      |      |      |      |      |      |      |
|------------------------------|------------------------------------------------------------------------------------|------|------|------|-----|------|------|------|------|------|------|------|
| Movement                     | EBL                                                                                | EBT  | EBR  | WBL  | WBT | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          |                                                                                    | ↩    | ↪    |      |     |      |      | ↩↪   | ↪    | ↩    | ↩↪   |      |
| Traffic Volume (veh/h)       | 369                                                                                | 79   | 75   | 0    | 0   | 0    | 0    | 755  | 203  | 282  | 815  | 0    |
| Future Volume (veh/h)        | 369                                                                                | 79   | 75   | 0    | 0   | 0    | 0    | 755  | 203  | 282  | 815  | 0    |
| Initial Q (Qb), veh          | 0                                                                                  | 0    | 0    |      |     |      | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                               |      | 1.00 |      |     |      | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00                                                                               | 1.00 | 1.00 |      |     |      | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |                                                                                    | No   |      |      |     |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1856                                                                               | 1856 | 1856 |      |     |      | 0    | 1856 | 1856 | 1856 | 1856 | 0    |
| Adj Flow Rate, veh/h         | 384                                                                                | 82   | 78   |      |     |      | 0    | 786  | 211  | 294  | 849  | 0    |
| Peak Hour Factor             | 0.96                                                                               | 0.96 | 0.96 |      |     |      | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, %         | 3                                                                                  | 3    | 3    |      |     |      | 0    | 3    | 3    | 3    | 3    | 0    |
| Cap, veh/h                   | 432                                                                                | 92   | 463  |      |     |      | 0    | 1253 | 559  | 336  | 2111 | 0    |
| Arrive On Green              | 0.29                                                                               | 0.29 | 0.29 |      |     |      | 0.00 | 0.36 | 0.36 | 0.19 | 0.60 | 0.00 |
| Sat Flow, veh/h              | 1469                                                                               | 314  | 1572 |      |     |      | 0    | 3618 | 1572 | 1767 | 3618 | 0    |
| Grp Volume(v), veh/h         | 466                                                                                | 0    | 78   |      |     |      | 0    | 786  | 211  | 294  | 849  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1782                                                                               | 0    | 1572 |      |     |      | 0    | 1763 | 1572 | 1767 | 1763 | 0    |
| Q Serve(g_s), s              | 21.1                                                                               | 0.0  | 3.1  |      |     |      | 0.0  | 15.6 | 8.4  | 13.6 | 10.7 | 0.0  |
| Cycle Q Clear(g_c), s        | 21.1                                                                               | 0.0  | 3.1  |      |     |      | 0.0  | 15.6 | 8.4  | 13.6 | 10.7 | 0.0  |
| Prop In Lane                 | 0.82                                                                               |      | 1.00 |      |     |      | 0.00 |      | 1.00 | 1.00 |      | 0.00 |
| Lane Grp Cap(c), veh/h       | 525                                                                                | 0    | 463  |      |     |      | 0    | 1253 | 559  | 336  | 2111 | 0    |
| V/C Ratio(X)                 | 0.89                                                                               | 0.00 | 0.17 |      |     |      | 0.00 | 0.63 | 0.38 | 0.88 | 0.40 | 0.00 |
| Avail Cap(c_a), veh/h        | 644                                                                                | 0    | 569  |      |     |      | 0    | 1253 | 559  | 430  | 2111 | 0    |
| HCM Platoon Ratio            | 1.00                                                                               | 1.00 | 1.00 |      |     |      | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00                                                                               | 0.00 | 1.00 |      |     |      | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 28.4                                                                               | 0.0  | 22.1 |      |     |      | 0.0  | 22.5 | 20.2 | 33.2 | 8.9  | 0.0  |
| Incr Delay (d2), s/veh       | 12.3                                                                               | 0.0  | 0.2  |      |     |      | 0.0  | 2.4  | 1.9  | 15.1 | 0.6  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0                                                                                | 0.0  | 0.0  |      |     |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 10.0                                                                               | 0.0  | 1.1  |      |     |      | 0.0  | 6.4  | 3.2  | 7.1  | 3.8  | 0.0  |
| Unsig. Movement Delay, s/veh |                                                                                    |      |      |      |     |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 40.8                                                                               | 0.0  | 22.3 |      |     |      | 0.0  | 24.9 | 22.2 | 48.3 | 9.5  | 0.0  |
| LnGrp LOS                    | D                                                                                  | A    | C    |      |     |      | A    | C    | C    | D    | A    | A    |
| Approach Vol, veh/h          |                                                                                    | 544  |      |      |     |      |      | 997  |      |      | 1143 |      |
| Approach Delay, s/veh        |                                                                                    | 38.1 |      |      |     |      |      | 24.3 |      |      | 19.5 |      |
| Approach LOS                 |                                                                                    | D    |      |      |     |      |      | C    |      |      | B    |      |
| Timer - Assigned Phs         | 1                                                                                  | 2    |      | 4    |     | 6    |      |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 20.5                                                                               | 34.5 |      | 29.3 |     | 55.0 |      |      |      |      |      |      |
| Change Period (Y+Rc), s      | 4.5                                                                                | 4.5  |      | 4.5  |     | 4.5  |      |      |      |      |      |      |
| Max Green Setting (Gmax), s  | 20.5                                                                               | 25.5 |      | 30.5 |     | 50.5 |      |      |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 15.6                                                                               | 17.6 |      | 23.1 |     | 12.7 |      |      |      |      |      |      |
| Green Ext Time (p_c), s      | 0.4                                                                                | 3.5  |      | 1.8  |     | 7.2  |      |      |      |      |      |      |
| <b>Intersection Summary</b>  |                                                                                    |      |      |      |     |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |                                                                                    |      | 25.1 |      |     |      |      |      |      |      |      |      |
| HCM 6th LOS                  |                                                                                    |      | C    |      |     |      |      |      |      |      |      |      |



HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

10/31/2020

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 15.6 |
| Intersection LOS          | C    |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 70                                                                                | 265                                                                               | 26   | 9                                                                                 | 337                                                                               | 40   | 38   | 47                                                                                  | 4    | 88   | 29                                                                                  | 87   |
| Future Vol, veh/h   | 70                                                                                | 265                                                                               | 26   | 9                                                                                 | 337                                                                               | 40   | 38   | 47                                                                                  | 4    | 88   | 29                                                                                  | 87   |
| Peak Hour Factor    | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96 | 0.96                                                                                | 0.96 | 0.96 | 0.96                                                                                | 0.96 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 73                                                                                | 276                                                                               | 27   | 9                                                                                 | 351                                                                               | 42   | 40   | 49                                                                                  | 4    | 92   | 30                                                                                  | 91   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 2    | 2    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 2    | 2    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 2    | 2    |
| HCM Control Delay          | 14.2 | 19.4 | 11.2 | 12.7 |
| HCM LOS                    | B    | C    | B    | B    |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 43%   | 100%  | 0%    | 100%  | 0%    | 43%   |
| Vol Thru, %            | 53%   | 0%    | 91%   | 0%    | 89%   | 14%   |
| Vol Right, %           | 4%    | 0%    | 9%    | 0%    | 11%   | 43%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 89    | 70    | 291   | 9     | 377   | 204   |
| LT Vol                 | 38    | 70    | 0     | 9     | 0     | 88    |
| Through Vol            | 47    | 0     | 265   | 0     | 337   | 29    |
| RT Vol                 | 4     | 0     | 26    | 0     | 40    | 87    |
| Lane Flow Rate         | 93    | 73    | 303   | 9     | 393   | 212   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.175 | 0.134 | 0.511 | 0.017 | 0.656 | 0.362 |
| Departure Headway (Hd) | 6.785 | 6.638 | 6.065 | 6.601 | 6.018 | 6.134 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 532   | 537   | 591   | 540   | 597   | 582   |
| Service Time           | 4.785 | 4.413 | 3.84  | 4.373 | 3.789 | 4.222 |
| HCM Lane V/C Ratio     | 0.175 | 0.136 | 0.513 | 0.017 | 0.658 | 0.364 |
| HCM Control Delay      | 11.2  | 10.4  | 15.1  | 9.5   | 19.6  | 12.7  |
| HCM Lane LOS           | B     | B     | C     | A     | C     | B     |
| HCM 95th-tile Q        | 0.6   | 0.5   | 2.9   | 0.1   | 4.8   | 1.6   |

# EXISTING PLUS PROJECT WORKSHEETS

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

10/31/2020

| Intersection             |      |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 2.1  |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL  | EBT  | EBR                                                                               | WBL  | WBT  | WBR                                                                               | NBL  | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |      |      |  |      |      |  |      |  |      |  |  |      |
| Traffic Vol, veh/h       | 0    | 0    | 72                                                                                | 0    | 0    | 95                                                                                | 0    | 1183                                                                              | 165  | 63                                                                                  | 780                                                                                 | 100  |
| Future Vol, veh/h        | 0    | 0    | 72                                                                                | 0    | 0    | 95                                                                                | 0    | 1183                                                                              | 165  | 63                                                                                  | 780                                                                                 | 100  |
| Conflicting Peds, #/hr   | 0    | 0    | 0                                                                                 | 0    | 0    | 0                                                                                 | 0    | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop | Stop | Stop                                                                              | Stop | Stop | Stop                                                                              | Free | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -    | -    | None                                                                              | -    | -    | None                                                                              | -    | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | -    | -    | 0                                                                                 | -    | -    | 0                                                                                 | -    | -                                                                                 | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -    | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -    | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 88   | 88   | 88                                                                                | 88   | 88   | 88                                                                                | 88   | 88                                                                                | 88   | 88                                                                                  | 88                                                                                  | 88   |
| Heavy Vehicles, %        | 3    | 3    | 3                                                                                 | 3    | 3    | 3                                                                                 | 3    | 3                                                                                 | 3    | 3                                                                                   | 3                                                                                   | 3    |
| Mvmt Flow                | 0    | 0    | 82                                                                                | 0    | 0    | 108                                                                               | 0    | 1344                                                                              | 188  | 72                                                                                  | 886                                                                                 | 114  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |      |
|----------------------|--------|---|--------|---|--------|------|--------|------|
| Conflicting Flow All | -      | - | 500    | - | -      | 766  | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16 | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93 | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | 440    | 0 | 0      | 295  | 0      | 213  |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | 440    | - | -      | 295  | -      | 213  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |

| Approach             | EB | WB   | NB | SB |
|----------------------|----|------|----|----|
| HCM Control Delay, s | 15 | 24.1 | 0  | 2  |
| HCM LOS              | C  | C    |    |    |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | -   | -   | 440        | 295   | 213   | -   |
| HCM Lane V/C Ratio    | -   | -   | 0.186      | 0.366 | 0.336 | -   |
| HCM Control Delay (s) | -   | -   | 15         | 24.1  | 30.2  | -   |
| HCM Lane LOS          | -   | -   | C          | C     | D     | -   |
| HCM 95th %tile Q(veh) | -   | -   | 0.7        | 1.6   | 1.4   | -   |

HCM 6th TWSC  
6: Campus Dr & 6th Street

10/31/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 3.8  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↔    |      |      | ↔    |      |      | ↔    |      |      | ↔    |      |
| Traffic Vol, veh/h       | 16   | 13   | 1    | 0    | 10   | 73   | 1    | 57   | 1    | 30   | 145  | 25   |
| Future Vol, veh/h        | 16   | 13   | 1    | 0    | 10   | 73   | 1    | 57   | 1    | 30   | 145  | 25   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 23   | 19   | 1    | 0    | 14   | 104  | 1    | 81   | 1    | 43   | 207  | 36   |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 454    | 395   | 225    | 405   | 413    | 82    | 243    | 0 | 0 | 82    | 0 | 0 |
| Stage 1              | 311    | 311   | -      | 84    | 84     | -     | -      | - | - | -     | - | - |
| Stage 2              | 143    | 84    | -      | 321   | 329    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.13   | 6.53  | 6.23   | 7.13  | 6.53   | 6.23  | 4.13   | - | - | 4.13  | - | - |
| Critical Hdwy Stg 1  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.527  | 4.027 | 3.327  | 3.527 | 4.027  | 3.327 | 2.227  | - | - | 2.227 | - | - |
| Pot Cap-1 Maneuver   | 515    | 540   | 812    | 554   | 528    | 975   | 1317   | - | - | 1509  | - | - |
| Stage 1              | 697    | 656   | -      | 922   | 823    | -     | -      | - | - | -     | - | - |
| Stage 2              | 857    | 823   | -      | 689   | 645    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 438    | 522   | 812    | 524   | 510    | 975   | 1317   | - | - | 1509  | - | - |
| Mov Cap-2 Maneuver   | 438    | 522   | -      | 524   | 510    | -     | -      | - | - | -     | - | - |
| Stage 1              | 696    | 634   | -      | 921   | 822    | -     | -      | - | - | -     | - | - |
| Stage 2              | 751    | 822   | -      | 646   | 624    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB  |  | NB  |  | SB  |  |
|----------------------|------|--|-----|--|-----|--|-----|--|
| HCM Control Delay, s | 13.3 |  | 9.7 |  | 0.1 |  | 1.1 |  |
| HCM LOS              | B    |  | A   |  |     |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 1317  | -   | -   | 479        | 878   | 1509  | -   |
| HCM Lane V/C Ratio    | 0.001 | -   | -   | 0.089      | 0.135 | 0.028 | -   |
| HCM Control Delay (s) | 7.7   | 0   | -   | 13.3       | 9.7   | 7.5   | 0   |
| HCM Lane LOS          | A     | A   | -   | B          | A     | A     | A   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0.3        | 0.5   | 0.1   | -   |

| Intersection             |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|--------|------|-----------------------------------------------------------------------------------|------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 1.8    |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL    | EBT  | EBR                                                                               | WBL        | WBT    | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |        |      |  |            |        |  |  |  |      |  |  |      |
| Traffic Vol, veh/h       | 0      | 0    | 52                                                                                | 0          | 0      | 52                                                                                | 99                                                                                | 779                                                                               | 64   | 74                                                                                  | 545                                                                                 | 14   |
| Future Vol, veh/h        | 0      | 0    | 52                                                                                | 0          | 0      | 52                                                                                | 99                                                                                | 779                                                                               | 64   | 74                                                                                  | 545                                                                                 | 14   |
| Conflicting Peds, #/hr   | 0      | 0    | 0                                                                                 | 0          | 0      | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop   | Stop | Stop                                                                              | Stop       | Stop   | Stop                                                                              | Free                                                                              | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -      | -    | None                                                                              | -          | -      | None                                                                              | -                                                                                 | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | -      | -    | 0                                                                                 | -          | -      | 0                                                                                 | 75                                                                                | -                                                                                 | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -      | 0    | -                                                                                 | -          | 0      | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -      | 0    | -                                                                                 | -          | 0      | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 87     | 87   | 87                                                                                | 87         | 87     | 87                                                                                | 87                                                                                | 87                                                                                | 87   | 87                                                                                  | 87                                                                                  | 87   |
| Heavy Vehicles, %        | 3      | 3    | 3                                                                                 | 3          | 3      | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                   | 3                                                                                   | 3    |
| Mvmt Flow                | 0      | 0    | 60                                                                                | 0          | 0      | 60                                                                                | 114                                                                               | 895                                                                               | 74   | 85                                                                                  | 626                                                                                 | 16   |
|                          |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Major/Minor              | Minor2 |      | Minor1                                                                            |            | Major1 |                                                                                   | Major2                                                                            |                                                                                   |      |                                                                                     |                                                                                     |      |
| Conflicting Flow All     | -      | -    | 321                                                                               | -          | -      | 485                                                                               | 642                                                                               | 0                                                                                 | 0    | 969                                                                                 | 0                                                                                   | 0    |
| Stage 1                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 2                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Critical Hdwy            | -      | -    | 6.96                                                                              | -          | -      | 6.96                                                                              | 4.16                                                                              | -                                                                                 | -    | 4.16                                                                                | -                                                                                   | -    |
| Critical Hdwy Stg 1      | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Critical Hdwy Stg 2      | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Follow-up Hdwy           | -      | -    | 3.33                                                                              | -          | -      | 3.33                                                                              | 2.23                                                                              | -                                                                                 | -    | 2.23                                                                                | -                                                                                   | -    |
| Pot Cap-1 Maneuver       | 0      | 0    | 672                                                                               | 0          | 0      | 525                                                                               | 932                                                                               | -                                                                                 | -    | 701                                                                                 | -                                                                                   | -    |
| Stage 1                  | 0      | 0    | -                                                                                 | 0          | 0      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 2                  | 0      | 0    | -                                                                                 | 0          | 0      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Platoon blocked, %       |        |      |                                                                                   |            |        |                                                                                   |                                                                                   | -                                                                                 | -    |                                                                                     | -                                                                                   | -    |
| Mov Cap-1 Maneuver       | -      | -    | 672                                                                               | -          | -      | 525                                                                               | 932                                                                               | -                                                                                 | -    | 701                                                                                 | -                                                                                   | -    |
| Mov Cap-2 Maneuver       | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 1                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 2                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
|                          |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|                          |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Approach                 | EB     |      | WB                                                                                |            | NB     |                                                                                   | SB                                                                                |                                                                                   |      |                                                                                     |                                                                                     |      |
| HCM Control Delay, s     | 10.9   |      | 12.7                                                                              |            | 1      |                                                                                   | 1.3                                                                               |                                                                                   |      |                                                                                     |                                                                                     |      |
| HCM LOS                  | B      |      | B                                                                                 |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|                          |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Minor Lane/Major Mvmt    | NBL    | NBT  | NBR                                                                               | EBLn1WBLn1 | SBL    | SBT                                                                               | SBR                                                                               |                                                                                   |      |                                                                                     |                                                                                     |      |
| Capacity (veh/h)         | 932    | -    | -                                                                                 | 672        | 525    | 701                                                                               | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM Lane V/C Ratio       | 0.122  | -    | -                                                                                 | 0.089      | 0.114  | 0.121                                                                             | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM Control Delay (s)    | 9.4    | -    | -                                                                                 | 10.9       | 12.7   | 10.8                                                                              | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM Lane LOS             | A      | -    | -                                                                                 | B          | B      | B                                                                                 | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM 95th %tile Q(veh)    | 0.4    | -    | -                                                                                 | 0.3        | 0.4    | 0.4                                                                               | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |



# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

10/31/2020

|                                                                      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|
| Movement                                                             | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |  |  |  |  |  |  |  |  |  |  |
| Lane Configurations                                                  |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)                                               | 46                                                                                | 488                                                                               | 51                                                                                | 864                                                                               | 0                                                                                 | 0                                                                                 | 535                                                                                 | 313                                                                                 | 0                                                                                   | 0                                                                                   |  |  |  |  |  |  |  |  |  |  |
| Future Volume (veh/h)                                                | 46                                                                                | 488                                                                               | 51                                                                                | 864                                                                               | 0                                                                                 | 0                                                                                 | 535                                                                                 | 313                                                                                 | 0                                                                                   | 0                                                                                   |  |  |  |  |  |  |  |  |  |  |
| Initial Q (Qb), veh                                                  | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Ped-Bike Adj(A_pbT)                                                  | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Parking Bus, Adj                                                     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Work Zone On Approach                                                | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Adj Sat Flow, veh/h/ln                                               | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Adj Flow Rate, veh/h                                                 | 51                                                                                | 542                                                                               | 57                                                                                | 960                                                                               | 0                                                                                 | 0                                                                                 | 594                                                                                 | 348                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Peak Hour Factor                                                     | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                                | 0.90                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Percent Heavy Veh, %                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Cap, veh/h                                                           | 388                                                                               | 690                                                                               | 83                                                                                | 2321                                                                              | 0                                                                                 | 0                                                                                 | 1941                                                                                | 866                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Arrive On Green                                                      | 0.22                                                                              | 0.22                                                                              | 0.05                                                                              | 0.66                                                                              | 0.00                                                                              | 0.00                                                                              | 0.55                                                                                | 0.55                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Sat Flow, veh/h                                                      | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Grp Volume(v), veh/h                                                 | 51                                                                                | 542                                                                               | 57                                                                                | 960                                                                               | 0                                                                                 | 0                                                                                 | 594                                                                                 | 348                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Grp Sat Flow(s),veh/h/ln                                             | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Q Serve(g_s), s                                                      | 1.7                                                                               | 12.0                                                                              | 2.3                                                                               | 9.4                                                                               | 0.0                                                                               | 0.0                                                                               | 6.7                                                                                 | 9.4                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Cycle Q Clear(g_c), s                                                | 1.7                                                                               | 12.0                                                                              | 2.3                                                                               | 9.4                                                                               | 0.0                                                                               | 0.0                                                                               | 6.7                                                                                 | 9.4                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Prop In Lane                                                         | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Lane Grp Cap(c), veh/h                                               | 388                                                                               | 690                                                                               | 83                                                                                | 2321                                                                              | 0                                                                                 | 0                                                                                 | 1941                                                                                | 866                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| V/C Ratio(X)                                                         | 0.13                                                                              | 0.79                                                                              | 0.69                                                                              | 0.41                                                                              | 0.00                                                                              | 0.00                                                                              | 0.31                                                                                | 0.40                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Avail Cap(c_a), veh/h                                                | 780                                                                               | 1387                                                                              | 228                                                                               | 2321                                                                              | 0                                                                                 | 0                                                                                 | 1941                                                                                | 866                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| HCM Platoon Ratio                                                    | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Upstream Filter(I)                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Uniform Delay (d), s/veh                                             | 23.1                                                                              | 27.1                                                                              | 34.6                                                                              | 5.9                                                                               | 0.0                                                                               | 0.0                                                                               | 9.0                                                                                 | 9.6                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Incr Delay (d2), s/veh                                               | 0.2                                                                               | 2.0                                                                               | 9.8                                                                               | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 0.4                                                                                 | 1.4                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Initial Q Delay(d3),s/veh                                            | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| %ile BackOfQ(50%),veh/ln                                             | 0.7                                                                               | 4.3                                                                               | 1.2                                                                               | 2.6                                                                               | 0.0                                                                               | 0.0                                                                               | 2.2                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Unsig. Movement Delay, s/veh                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| LnGrp Delay(d),s/veh                                                 | 23.3                                                                              | 29.1                                                                              | 44.4                                                                              | 6.5                                                                               | 0.0                                                                               | 0.0                                                                               | 9.4                                                                                 | 10.9                                                                                |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| LnGrp LOS                                                            | C                                                                                 | C                                                                                 | D                                                                                 | A                                                                                 | A                                                                                 | A                                                                                 | A                                                                                   | B                                                                                   |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Approach Vol, veh/h                                                  | 593                                                                               |                                                                                   |                                                                                   | 1017                                                                              |                                                                                   |                                                                                   | 942                                                                                 |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Approach Delay, s/veh                                                | 28.6                                                                              |                                                                                   |                                                                                   | 8.6                                                                               |                                                                                   |                                                                                   | 9.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Approach LOS                                                         | C                                                                                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Timer - Assigned Phs                                                 | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Phs Duration (G+Y+Rc), s                                             | 53.0                                                                              |                                                                                   | 7.9                                                                               |                                                                                   | 45.1                                                                              |                                                                                   | 20.7                                                                                |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Change Period (Y+Rc), s                                              | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Max Green Setting (Gmax), s                                          | 48.5                                                                              |                                                                                   | 9.5                                                                               |                                                                                   | 34.5                                                                              |                                                                                   | 32.5                                                                                |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Max Q Clear Time (g_c+I1), s                                         | 11.4                                                                              |                                                                                   | 4.3                                                                               |                                                                                   | 11.4                                                                              |                                                                                   | 14.0                                                                                |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Green Ext Time (p_c), s                                              | 7.7                                                                               |                                                                                   | 0.0                                                                               |                                                                                   | 5.2                                                                               |                                                                                   | 2.2                                                                                 |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Intersection Summary                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| HCM 6th Ctrl Delay                                                   |                                                                                   |                                                                                   | 13.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| HCM 6th LOS                                                          |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| Notes                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |
| User approved volume balancing among the lanes for turning movement. |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |  |  |  |  |  |  |  |  |  |

# HCM 6th Signalized Intersection Summary 3: 12th Avenue & SR 198 EB Off Ramps

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 454                                                                               | 0                                                                                 | 16                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 459                                                                                 | 122                                                                                 | 0                                                                                   | 333                                                                                 | 246                                                                                 |
| Future Volume (veh/h)        | 454                                                                               | 0                                                                                 | 16                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 459                                                                                 | 122                                                                                 | 0                                                                                   | 333                                                                                 | 246                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 504                                                                               | 0                                                                                 | 18                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 510                                                                                 | 0                                                                                   | 0                                                                                   | 370                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.90                                                                               | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 675                                                                               | 0                                                                                 | 310                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2346                                                                                |                                                                                     | 0                                                                                   | 2346                                                                                |                                                                                     |
| Arrive On Green              | 0.20                                                                              | 0.00                                                                              | 0.20                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.67                                                                                | 0.00                                                                                | 0.00                                                                                | 0.67                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 504                                                                               | 0                                                                                 | 18                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 510                                                                                 | 0                                                                                   | 0                                                                                   | 370                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 9.0                                                                               | 0.0                                                                               | 0.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 3.7                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.6                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 9.0                                                                               | 0.0                                                                               | 0.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 3.7                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.6                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 675                                                                               | 0                                                                                 | 310                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2346                                                                                |                                                                                     | 0                                                                                   | 2346                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.75                                                                              | 0.00                                                                              | 0.06                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.22                                                                                |                                                                                     | 0.00                                                                                | 0.16                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1966                                                                              | 0                                                                                 | 902                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2346                                                                                |                                                                                     | 0                                                                                   | 2346                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 24.7                                                                              | 0.0                                                                               | 21.3                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 4.3                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.1                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 1.7                                                                               | 0.0                                                                               | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.1                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 3.4                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.6                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 26.4                                                                              | 0.0                                                                               | 21.4                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 4.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.2                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 522                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 510                                                                                |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 26.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 4.5                                                                                |                                                                                     |                                                                                     | 4.2                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                  |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 48.0                                                                              |                                                                                   |                                                                                   | 17.4                                                                              |                                                                                   |                                                                                   | 48.0                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 43.5                                                                              |                                                                                   |                                                                                   | 37.5                                                                              |                                                                                   |                                                                                   | 43.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 5.7                                                                               |                                                                                   |                                                                                   | 11.0                                                                              |                                                                                   |                                                                                   | 4.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 3.5                                                                               |                                                                                   |                                                                                   | 1.8                                                                               |                                                                                   |                                                                                   | 2.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 12.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 20                                                                                | 390                                                                               | 73                                                                                | 94                                                                                | 390                                                                               | 43                                                                                | 35                                                                                  | 47                                                                                  | 67                                                                                  | 44                                                                                  | 65                                                                                  | 12                                                                                  |
| Future Volume (veh/h)        | 20                                                                                | 390                                                                               | 73                                                                                | 94                                                                                | 390                                                                               | 43                                                                                | 35                                                                                  | 47                                                                                  | 67                                                                                  | 44                                                                                  | 65                                                                                  | 12                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 22                                                                                | 424                                                                               | 79                                                                                | 102                                                                               | 424                                                                               | 47                                                                                | 38                                                                                  | 51                                                                                  | 73                                                                                  | 48                                                                                  | 71                                                                                  | 13                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 44                                                                                | 615                                                                               | 274                                                                               | 133                                                                               | 791                                                                               | 353                                                                               | 67                                                                                  | 299                                                                                 | 428                                                                                 | 93                                                                                  | 832                                                                                 | 705                                                                                 |
| Arrive On Green              | 0.02                                                                              | 0.17                                                                              | 0.17                                                                              | 0.08                                                                              | 0.22                                                                              | 0.22                                                                              | 0.04                                                                                | 0.43                                                                                | 0.43                                                                                | 0.05                                                                                | 0.45                                                                                | 0.45                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                                | 690                                                                                 | 988                                                                                 | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 22                                                                                | 424                                                                               | 79                                                                                | 102                                                                               | 424                                                                               | 47                                                                                | 38                                                                                  | 0                                                                                   | 124                                                                                 | 48                                                                                  | 71                                                                                  | 13                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                                | 0                                                                                   | 1678                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.8                                                                               | 7.7                                                                               | 3.0                                                                               | 3.9                                                                               | 7.2                                                                               | 1.2                                                                               | 1.4                                                                                 | 0.0                                                                                 | 3.1                                                                                 | 1.8                                                                                 | 1.5                                                                                 | 0.3                                                                                 |
| Cycle Q Clear(g_c), s        | 0.8                                                                               | 7.7                                                                               | 3.0                                                                               | 3.9                                                                               | 7.2                                                                               | 1.2                                                                               | 1.4                                                                                 | 0.0                                                                                 | 3.1                                                                                 | 1.8                                                                                 | 1.5                                                                                 | 0.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.59                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 44                                                                                | 615                                                                               | 274                                                                               | 133                                                                               | 791                                                                               | 353                                                                               | 67                                                                                  | 0                                                                                   | 727                                                                                 | 93                                                                                  | 832                                                                                 | 705                                                                                 |
| V/C Ratio(X)                 | 0.50                                                                              | 0.69                                                                              | 0.29                                                                              | 0.77                                                                              | 0.54                                                                              | 0.13                                                                              | 0.57                                                                                | 0.00                                                                                | 0.17                                                                                | 0.52                                                                                | 0.09                                                                                | 0.02                                                                                |
| Avail Cap(c_a), veh/h        | 169                                                                               | 1062                                                                              | 474                                                                               | 351                                                                               | 1425                                                                              | 636                                                                               | 195                                                                                 | 0                                                                                   | 727                                                                                 | 221                                                                                 | 832                                                                                 | 705                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 32.7                                                                              | 26.4                                                                              | 24.4                                                                              | 30.9                                                                              | 23.3                                                                              | 12.2                                                                              | 32.2                                                                                | 0.0                                                                                 | 11.8                                                                                | 31.4                                                                                | 10.8                                                                                | 10.4                                                                                |
| Incr Delay (d2), s/veh       | 8.4                                                                               | 1.4                                                                               | 0.6                                                                               | 9.0                                                                               | 0.6                                                                               | 0.2                                                                               | 7.5                                                                                 | 0.0                                                                                 | 0.5                                                                                 | 4.4                                                                                 | 0.2                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.4                                                                               | 3.1                                                                               | 1.1                                                                               | 1.9                                                                               | 2.8                                                                               | 0.6                                                                               | 0.7                                                                                 | 0.0                                                                                 | 1.1                                                                                 | 0.9                                                                                 | 0.6                                                                                 | 0.1                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 41.2                                                                              | 27.7                                                                              | 25.0                                                                              | 39.9                                                                              | 23.8                                                                              | 12.4                                                                              | 39.7                                                                                | 0.0                                                                                 | 12.3                                                                                | 35.8                                                                                | 11.0                                                                                | 10.5                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                   | A                                                                                   | B                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 525                                                                               |                                                                                   |                                                                                   | 573                                                                               |                                                                                   |                                                                                   | 162                                                                                 |                                                                                     |                                                                                     | 132                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 27.9                                                                              |                                                                                   |                                                                                   | 25.7                                                                              |                                                                                   |                                                                                   | 18.7                                                                                |                                                                                     |                                                                                     | 20.0                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.1                                                                               | 34.0                                                                              | 9.6                                                                               | 16.4                                                                              | 7.1                                                                               | 35.0                                                                              | 6.2                                                                                 | 19.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.5                                                                               | 29.5                                                                              | 13.5                                                                              | 20.5                                                                              | 7.5                                                                               | 30.5                                                                              | 6.5                                                                                 | 27.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 3.8                                                                               | 5.1                                                                               | 5.9                                                                               | 9.7                                                                               | 3.4                                                                               | 3.5                                                                               | 2.8                                                                                 | 9.2                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.7                                                                               | 0.1                                                                               | 2.2                                                                               | 0.0                                                                               | 0.4                                                                               | 0.0                                                                                 | 2.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 25.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 83                                                                                | 176                                                                               | 110                                                                               | 42                                                                                | 226                                                                               | 42                                                                                | 259                                                                                | 451                                                                                 | 50                                                                                  | 61                                                                                  | 516                                                                                 | 131                                                                                 |
| Future Volume (veh/h)        | 83                                                                                | 176                                                                               | 110                                                                               | 42                                                                                | 226                                                                               | 42                                                                                | 259                                                                                | 451                                                                                 | 50                                                                                  | 61                                                                                  | 516                                                                                 | 131                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 92                                                                                | 196                                                                               | 122                                                                               | 47                                                                                | 251                                                                               | 47                                                                                | 288                                                                                | 501                                                                                 | 56                                                                                  | 68                                                                                  | 573                                                                                 | 146                                                                                 |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                               | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 212                                                                               | 541                                                                               | 242                                                                               | 77                                                                                | 403                                                                               | 74                                                                                | 400                                                                                | 1516                                                                                | 169                                                                                 | 96                                                                                  | 1451                                                                                | 647                                                                                 |
| Arrive On Green              | 0.06                                                                              | 0.15                                                                              | 0.15                                                                              | 0.04                                                                              | 0.14                                                                              | 0.14                                                                              | 0.12                                                                               | 0.47                                                                                | 0.47                                                                                | 0.05                                                                                | 0.41                                                                                | 0.41                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2972                                                                              | 548                                                                               | 3428                                                                               | 3198                                                                                | 356                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 92                                                                                | 196                                                                               | 122                                                                               | 47                                                                                | 147                                                                               | 151                                                                               | 288                                                                                | 275                                                                                 | 282                                                                                 | 68                                                                                  | 573                                                                                 | 146                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1757                                                                              | 1714                                                                               | 1763                                                                                | 1791                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.7                                                                               | 3.3                                                                               | 3.3                                                                               | 1.7                                                                               | 5.2                                                                               | 5.3                                                                               | 5.3                                                                                | 6.4                                                                                 | 6.4                                                                                 | 2.5                                                                                 | 7.5                                                                                 | 4.0                                                                                 |
| Cycle Q Clear(g_c), s        | 1.7                                                                               | 3.3                                                                               | 3.3                                                                               | 1.7                                                                               | 5.2                                                                               | 5.3                                                                               | 5.3                                                                                | 6.4                                                                                 | 6.4                                                                                 | 2.5                                                                                 | 7.5                                                                                 | 4.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.31                                                                              | 1.00                                                                               |                                                                                     | 0.20                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 212                                                                               | 541                                                                               | 242                                                                               | 77                                                                                | 239                                                                               | 238                                                                               | 400                                                                                | 836                                                                                 | 849                                                                                 | 96                                                                                  | 1451                                                                                | 647                                                                                 |
| V/C Ratio(X)                 | 0.43                                                                              | 0.36                                                                              | 0.51                                                                              | 0.61                                                                              | 0.62                                                                              | 0.63                                                                              | 0.72                                                                               | 0.33                                                                                | 0.33                                                                                | 0.71                                                                                | 0.39                                                                                | 0.23                                                                                |
| Avail Cap(c_a), veh/h        | 287                                                                               | 1440                                                                              | 642                                                                               | 180                                                                               | 752                                                                               | 750                                                                               | 601                                                                                | 836                                                                                 | 849                                                                                 | 245                                                                                 | 1451                                                                                | 647                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 29.7                                                                              | 24.9                                                                              | 12.5                                                                              | 30.8                                                                              | 26.8                                                                              | 26.8                                                                              | 27.9                                                                               | 10.8                                                                                | 10.8                                                                                | 30.5                                                                                | 13.6                                                                                | 12.5                                                                                |
| Incr Delay (d2), s/veh       | 1.4                                                                               | 0.4                                                                               | 1.6                                                                               | 7.4                                                                               | 2.6                                                                               | 2.8                                                                               | 2.4                                                                                | 1.1                                                                                 | 1.0                                                                                 | 9.3                                                                                 | 0.8                                                                                 | 0.8                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 1.3                                                                               | 1.7                                                                               | 0.9                                                                               | 2.2                                                                               | 2.3                                                                               | 2.2                                                                                | 2.4                                                                                 | 2.4                                                                                 | 1.2                                                                                 | 2.8                                                                                 | 1.4                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 31.1                                                                              | 25.3                                                                              | 14.1                                                                              | 38.2                                                                              | 29.3                                                                              | 29.6                                                                              | 30.4                                                                               | 11.8                                                                                | 11.8                                                                                | 39.8                                                                                | 14.4                                                                                | 13.3                                                                                |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | B                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | C                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 410                                                                               |                                                                                   |                                                                                   | 345                                                                               |                                                                                   |                                                                                   | 845                                                                                |                                                                                     |                                                                                     | 787                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 23.3                                                                              |                                                                                   |                                                                                   | 30.7                                                                              |                                                                                   |                                                                                   | 18.1                                                                               |                                                                                     |                                                                                     | 16.4                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.1                                                                               | 35.6                                                                              | 7.4                                                                               | 14.6                                                                              | 12.2                                                                              | 31.5                                                                              | 8.6                                                                                | 13.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.1                                                                               | 29.4                                                                              | 6.7                                                                               | 26.8                                                                              | 11.5                                                                              | 27.0                                                                              | 5.5                                                                                | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 4.5                                                                               | 8.4                                                                               | 3.7                                                                               | 5.3                                                                               | 7.3                                                                               | 9.5                                                                               | 3.7                                                                                | 7.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.2                                                                               | 0.0                                                                               | 1.5                                                                               | 0.4                                                                               | 4.0                                                                               | 0.0                                                                                | 1.6                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 20.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 8: 11th Avenue & 7th Street

10/31/2020

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|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 37                                                                                | 98                                                                                | 66                                                                                | 73                                                                                | 114                                                                               | 48                                                                                | 154                                                                                 | 450                                                                                 | 98                                                                                  | 71                                                                                  | 339                                                                                 | 64                                                                                  |
| Future Volume (veh/h)        | 37                                                                                | 98                                                                                | 66                                                                                | 73                                                                                | 114                                                                               | 48                                                                                | 154                                                                                 | 450                                                                                 | 98                                                                                  | 71                                                                                  | 339                                                                                 | 64                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 42                                                                                | 111                                                                               | 75                                                                                | 83                                                                                | 130                                                                               | 55                                                                                | 175                                                                                 | 511                                                                                 | 111                                                                                 | 81                                                                                  | 385                                                                                 | 73                                                                                  |
| Peak Hour Factor             | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 142                                                                               | 212                                                                               | 133                                                                               | 109                                                                               | 299                                                                               | 121                                                                               | 221                                                                                 | 1709                                                                                | 762                                                                                 | 107                                                                                 | 1483                                                                                | 661                                                                                 |
| Arrive On Green              | 0.04                                                                              | 0.10                                                                              | 0.10                                                                              | 0.06                                                                              | 0.12                                                                              | 0.12                                                                              | 0.12                                                                                | 0.48                                                                                | 0.48                                                                                | 0.06                                                                                | 0.42                                                                                | 0.42                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 2078                                                                              | 1305                                                                              | 1767                                                                              | 2450                                                                              | 990                                                                               | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 42                                                                                | 93                                                                                | 93                                                                                | 83                                                                                | 92                                                                                | 93                                                                                | 175                                                                                 | 511                                                                                 | 111                                                                                 | 81                                                                                  | 385                                                                                 | 73                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1621                                                                              | 1767                                                                              | 1763                                                                              | 1677                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.7                                                                               | 3.1                                                                               | 3.4                                                                               | 2.9                                                                               | 3.0                                                                               | 3.2                                                                               | 5.9                                                                                 | 5.4                                                                                 | 1.4                                                                                 | 2.8                                                                                 | 4.4                                                                                 | 1.7                                                                                 |
| Cycle Q Clear(g_c), s        | 0.7                                                                               | 3.1                                                                               | 3.4                                                                               | 2.9                                                                               | 3.0                                                                               | 3.2                                                                               | 5.9                                                                                 | 5.4                                                                                 | 1.4                                                                                 | 2.8                                                                                 | 4.4                                                                                 | 1.7                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.81                                                                              | 1.00                                                                              |                                                                                   | 0.59                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 142                                                                               | 180                                                                               | 165                                                                               | 109                                                                               | 215                                                                               | 204                                                                               | 221                                                                                 | 1709                                                                                | 762                                                                                 | 107                                                                                 | 1483                                                                                | 661                                                                                 |
| V/C Ratio(X)                 | 0.29                                                                              | 0.52                                                                              | 0.56                                                                              | 0.76                                                                              | 0.43                                                                              | 0.46                                                                              | 0.79                                                                                | 0.30                                                                                | 0.15                                                                                | 0.75                                                                                | 0.26                                                                                | 0.11                                                                                |
| Avail Cap(c_a), veh/h        | 277                                                                               | 741                                                                               | 681                                                                               | 214                                                                               | 813                                                                               | 773                                                                               | 357                                                                                 | 1709                                                                                | 762                                                                                 | 280                                                                                 | 1483                                                                                | 661                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 28.8                                                                              | 26.3                                                                              | 26.4                                                                              | 28.6                                                                              | 25.1                                                                              | 25.2                                                                              | 26.3                                                                                | 9.6                                                                                 | 3.2                                                                                 | 28.6                                                                                | 11.7                                                                                | 10.9                                                                                |
| Incr Delay (d2), s/veh       | 1.1                                                                               | 2.3                                                                               | 3.0                                                                               | 10.6                                                                              | 1.3                                                                               | 1.6                                                                               | 6.3                                                                                 | 0.4                                                                                 | 0.4                                                                                 | 10.2                                                                                | 0.4                                                                                 | 0.3                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.3                                                                               | 1.3                                                                               | 1.4                                                                               | 1.5                                                                               | 1.3                                                                               | 1.3                                                                               | 2.7                                                                                 | 1.8                                                                                 | 0.8                                                                                 | 1.4                                                                                 | 1.6                                                                                 | 0.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 29.9                                                                              | 28.6                                                                              | 29.4                                                                              | 39.2                                                                              | 26.5                                                                              | 26.8                                                                              | 32.6                                                                                | 10.1                                                                                | 3.6                                                                                 | 38.8                                                                                | 12.1                                                                                | 11.2                                                                                |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | C                                                                                   | B                                                                                   | A                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 228                                                                               |                                                                                   |                                                                                   | 268                                                                               |                                                                                   |                                                                                   | 797                                                                                 |                                                                                     |                                                                                     | 539                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.2                                                                              |                                                                                   |                                                                                   | 30.5                                                                              |                                                                                   |                                                                                   | 14.1                                                                                |                                                                                     |                                                                                     | 16.0                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.3                                                                               | 34.5                                                                              | 8.3                                                                               | 10.8                                                                              | 12.2                                                                              | 30.5                                                                              | 7.1                                                                                 | 12.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.8                                                                               | 28.7                                                                              | 7.5                                                                               | 26.0                                                                              | 12.5                                                                              | 26.0                                                                              | 5.0                                                                                 | 28.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 4.8                                                                               | 7.4                                                                               | 4.9                                                                               | 5.4                                                                               | 7.9                                                                               | 6.4                                                                               | 2.7                                                                                 | 5.2                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 3.7                                                                               | 0.0                                                                               | 0.9                                                                               | 0.2                                                                               | 2.6                                                                               | 0.0                                                                                 | 1.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 18.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

10/31/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 39                                                                                | 0                                                                                 | 60                                                                                | 4                                                                                 | 0                                                                                 | 5                                                                                 | 166                                                                                 | 897                                                                                 | 23                                                                                  | 1                                                                                   | 503                                                                                 | 94                                                                                  |
| Future Volume (veh/h)        | 39                                                                                | 0                                                                                 | 60                                                                                | 4                                                                                 | 0                                                                                 | 5                                                                                 | 166                                                                                 | 897                                                                                 | 23                                                                                  | 1                                                                                   | 503                                                                                 | 94                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 45                                                                                | 0                                                                                 | 70                                                                                | 5                                                                                 | 0                                                                                 | 6                                                                                 | 193                                                                                 | 1043                                                                                | 27                                                                                  | 1                                                                                   | 585                                                                                 | 109                                                                                 |
| Peak Hour Factor             | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 233                                                                               | 0                                                                                 | 115                                                                               | 103                                                                               | 22                                                                                | 50                                                                                | 246                                                                                 | 2493                                                                                | 65                                                                                  | 3                                                                                   | 2018                                                                                | 900                                                                                 |
| Arrive On Green              | 0.07                                                                              | 0.00                                                                              | 0.07                                                                              | 0.07                                                                              | 0.00                                                                              | 0.07                                                                              | 0.14                                                                                | 0.71                                                                                | 0.71                                                                                | 0.00                                                                                | 0.57                                                                                | 0.57                                                                                |
| Sat Flow, veh/h              | 1399                                                                              | 0                                                                                 | 1572                                                                              | 269                                                                               | 302                                                                               | 686                                                                               | 1767                                                                                | 3511                                                                                | 91                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 45                                                                                | 0                                                                                 | 70                                                                                | 11                                                                                | 0                                                                                 | 0                                                                                 | 193                                                                                 | 524                                                                                 | 546                                                                                 | 1                                                                                   | 585                                                                                 | 109                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1399                                                                              | 0                                                                                 | 1572                                                                              | 1257                                                                              | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1839                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.0                                                                               | 0.0                                                                               | 2.7                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 6.6                                                                                 | 7.7                                                                                 | 7.7                                                                                 | 0.0                                                                                 | 5.3                                                                                 | 2.0                                                                                 |
| Cycle Q Clear(g_c), s        | 1.5                                                                               | 0.0                                                                               | 2.7                                                                               | 2.7                                                                               | 0.0                                                                               | 0.0                                                                               | 6.6                                                                                 | 7.7                                                                                 | 7.7                                                                                 | 0.0                                                                                 | 5.3                                                                                 | 2.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.45                                                                              |                                                                                   | 0.55                                                                              | 1.00                                                                                |                                                                                     | 0.05                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 233                                                                               | 0                                                                                 | 115                                                                               | 175                                                                               | 0                                                                                 | 0                                                                                 | 246                                                                                 | 1252                                                                                | 1306                                                                                | 3                                                                                   | 2018                                                                                | 900                                                                                 |
| V/C Ratio(X)                 | 0.19                                                                              | 0.00                                                                              | 0.61                                                                              | 0.06                                                                              | 0.00                                                                              | 0.00                                                                              | 0.79                                                                                | 0.42                                                                                | 0.42                                                                                | 0.35                                                                                | 0.29                                                                                | 0.12                                                                                |
| Avail Cap(c_a), veh/h        | 722                                                                               | 0                                                                                 | 665                                                                               | 681                                                                               | 0                                                                                 | 0                                                                                 | 606                                                                                 | 1252                                                                                | 1306                                                                                | 155                                                                                 | 2018                                                                                | 900                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 27.6                                                                              | 0.0                                                                               | 28.2                                                                              | 27.1                                                                              | 0.0                                                                               | 0.0                                                                               | 26.1                                                                                | 3.7                                                                                 | 3.7                                                                                 | 31.3                                                                                | 6.9                                                                                 | 6.2                                                                                 |
| Incr Delay (d2), s/veh       | 0.4                                                                               | 0.0                                                                               | 5.1                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 5.5                                                                                 | 1.0                                                                                 | 1.0                                                                                 | 62.4                                                                                | 0.4                                                                                 | 0.3                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.6                                                                               | 0.0                                                                               | 1.1                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 3.0                                                                                 | 2.0                                                                                 | 2.0                                                                                 | 0.1                                                                                 | 1.7                                                                                 | 0.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 28.0                                                                              | 0.0                                                                               | 33.3                                                                              | 27.2                                                                              | 0.0                                                                               | 0.0                                                                               | 31.5                                                                                | 4.8                                                                                 | 4.7                                                                                 | 93.6                                                                                | 7.2                                                                                 | 6.4                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | C                                                                                   | A                                                                                   | A                                                                                   | F                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 115                                                                               |                                                                                   |                                                                                   | 11                                                                                |                                                                                   |                                                                                   | 1263                                                                                |                                                                                     |                                                                                     | 695                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 31.2                                                                              |                                                                                   |                                                                                   | 27.2                                                                              |                                                                                   |                                                                                   | 8.8                                                                                 |                                                                                     |                                                                                     | 7.2                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 4.6                                                                               | 49.0                                                                              | 9.1                                                                               |                                                                                   | 13.2                                                                              | 40.4                                                                              | 9.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.5                                                                               | 44.5                                                                              | 26.5                                                                              |                                                                                   | 21.5                                                                              | 28.5                                                                              | 26.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 2.0                                                                               | 9.7                                                                               | 4.7                                                                               |                                                                                   | 8.6                                                                               | 7.3                                                                               | 4.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 8.7                                                                               | 0.5                                                                               |                                                                                   | 0.4                                                                               | 4.4                                                                               | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 9.6                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

10/31/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |                                                                                   |                                                                                   |  |  |  |  |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 0                                                                                 | 0                                                                                 | 0                                                                                 | 118                                                                               | 16                                                                                | 335                                                                               | 52                                                                                  | 759                                                                                 | 0                                                                                   | 0                                                                                   | 434                                                                                 | 163                                                                                 |
| Future Volume (veh/h)        | 0                                                                                 | 0                                                                                 | 0                                                                                 | 118                                                                               | 16                                                                                | 335                                                                               | 52                                                                                  | 759                                                                                 | 0                                                                                   | 0                                                                                   | 434                                                                                 | 163                                                                                 |
| Initial Q (Qb), veh          |                                                                                   |                                                                                   |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                   |                                                                                   |                                                                                   | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                   |                                                                                   |                                                                                   | 137                                                                               | 19                                                                                | 390                                                                               | 60                                                                                  | 883                                                                                 | 0                                                                                   | 0                                                                                   | 505                                                                                 | 190                                                                                 |
| Peak Hour Factor             |                                                                                   |                                                                                   |                                                                                   | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                |
| Percent Heavy Veh, %         |                                                                                   |                                                                                   |                                                                                   | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                   |                                                                                   |                                                                                   | 507                                                                               | 533                                                                               | 451                                                                               | 86                                                                                  | 2074                                                                                | 0                                                                                   | 0                                                                                   | 1684                                                                                | 751                                                                                 |
| Arrive On Green              |                                                                                   |                                                                                   |                                                                                   | 0.29                                                                              | 0.29                                                                              | 0.29                                                                              | 0.05                                                                                | 0.59                                                                                | 0.00                                                                                | 0.00                                                                                | 0.48                                                                                | 0.48                                                                                |
| Sat Flow, veh/h              |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                   |                                                                                   |                                                                                   | 137                                                                               | 19                                                                                | 390                                                                               | 60                                                                                  | 883                                                                                 | 0                                                                                   | 0                                                                                   | 505                                                                                 | 190                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                   |                                                                                   |                                                                                   | 4.3                                                                               | 0.5                                                                               | 17.0                                                                              | 2.4                                                                                 | 9.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.3                                                                                 | 5.2                                                                                 |
| Cycle Q Clear(g_c), s        |                                                                                   |                                                                                   |                                                                                   | 4.3                                                                               | 0.5                                                                               | 17.0                                                                              | 2.4                                                                                 | 9.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.3                                                                                 | 5.2                                                                                 |
| Prop In Lane                 |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                   |                                                                                   |                                                                                   | 507                                                                               | 533                                                                               | 451                                                                               | 86                                                                                  | 2074                                                                                | 0                                                                                   | 0                                                                                   | 1684                                                                                | 751                                                                                 |
| V/C Ratio(X)                 |                                                                                   |                                                                                   |                                                                                   | 0.27                                                                              | 0.04                                                                              | 0.86                                                                              | 0.70                                                                                | 0.43                                                                                | 0.00                                                                                | 0.00                                                                                | 0.30                                                                                | 0.25                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                   |                                                                                   |                                                                                   | 942                                                                               | 989                                                                               | 838                                                                               | 257                                                                                 | 2074                                                                                | 0                                                                                   | 0                                                                                   | 1684                                                                                | 751                                                                                 |
| HCM Platoon Ratio            |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                   |                                                                                   |                                                                                   | 19.9                                                                              | 18.5                                                                              | 24.4                                                                              | 33.9                                                                                | 8.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 11.5                                                                                | 11.2                                                                                |
| Incr Delay (d2), s/veh       |                                                                                   |                                                                                   |                                                                                   | 0.3                                                                               | 0.0                                                                               | 5.1                                                                               | 9.9                                                                                 | 0.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.5                                                                                 | 0.8                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                   |                                                                                   |                                                                                   | 1.6                                                                               | 0.2                                                                               | 6.2                                                                               | 1.2                                                                                 | 3.3                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.3                                                                                 | 1.8                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                   |                                                                                   |                                                                                   | 20.2                                                                              | 18.6                                                                              | 29.5                                                                              | 43.8                                                                                | 8.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 12.0                                                                                | 12.0                                                                                |
| LnGrp LOS                    |                                                                                   |                                                                                   |                                                                                   | C                                                                                 | B                                                                                 | C                                                                                 | D                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 546                                                                               |                                                                                   |                                                                                     | 943                                                                                 |                                                                                     |                                                                                     | 695                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 26.8                                                                              |                                                                                   |                                                                                     | 11.0                                                                                |                                                                                     |                                                                                     | 12.0                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 5                                                                                 |                                                                                   |                                                                                   | 6                                                                                   |                                                                                     |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 47.0                                                                              |                                                                                   |                                                                                   | 8.0                                                                               |                                                                                   |                                                                                   | 39.0                                                                                |                                                                                     |                                                                                     | 25.2                                                                                |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     | 4.5                                                                                 |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 42.5                                                                              |                                                                                   |                                                                                   | 10.5                                                                              |                                                                                   |                                                                                   | 27.5                                                                                |                                                                                     |                                                                                     | 38.5                                                                                |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 11.9                                                                              |                                                                                   |                                                                                   | 4.4                                                                               |                                                                                   |                                                                                   | 8.3                                                                                 |                                                                                     |                                                                                     | 19.0                                                                                |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 7.3                                                                               |                                                                                   |                                                                                   | 0.0                                                                               |                                                                                   |                                                                                   | 3.8                                                                                 |                                                                                     |                                                                                     | 1.7                                                                                 |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 15.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |  |
| Traffic Volume (veh/h)       | 241                                                                               | 140                                                                               | 85                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 572                                                                                 | 134                                                                                 | 126                                                                                 | 429                                                                                 | 0                                                                                   |
| Future Volume (veh/h)        | 241                                                                               | 140                                                                               | 85                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 572                                                                                 | 134                                                                                 | 126                                                                                 | 429                                                                                 | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 301                                                                               | 175                                                                               | 106                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 715                                                                                 | 168                                                                                 | 158                                                                                 | 536                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.80                                                                              | 0.80                                                                              | 0.80                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.80                                                                               | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 348                                                                               | 202                                                                               | 481                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1459                                                                                | 651                                                                                 | 196                                                                                 | 2049                                                                                | 0                                                                                   |
| Arrive On Green              | 0.31                                                                              | 0.31                                                                              | 0.31                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.41                                                                                | 0.41                                                                                | 0.11                                                                                | 0.58                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 1137                                                                              | 661                                                                               | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 476                                                                               | 0                                                                                 | 106                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 715                                                                                 | 168                                                                                 | 158                                                                                 | 536                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1799                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 20.0                                                                              | 0.0                                                                               | 4.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 11.9                                                                                | 5.6                                                                                 | 7.0                                                                                 | 6.0                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 20.0                                                                              | 0.0                                                                               | 4.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 11.9                                                                                | 5.6                                                                                 | 7.0                                                                                 | 6.0                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 0.63                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 551                                                                               | 0                                                                                 | 481                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1459                                                                                | 651                                                                                 | 196                                                                                 | 2049                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 0.86                                                                              | 0.00                                                                              | 0.22                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.49                                                                                | 0.26                                                                                | 0.80                                                                                | 0.26                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 776                                                                               | 0                                                                                 | 678                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1459                                                                                | 651                                                                                 | 320                                                                                 | 2049                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 26.2                                                                              | 0.0                                                                               | 20.6                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 17.2                                                                                | 15.4                                                                                | 34.7                                                                                | 8.3                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 7.3                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 1.2                                                                                 | 1.0                                                                                 | 7.5                                                                                 | 0.3                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 8.8                                                                               | 0.0                                                                               | 1.4                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 4.6                                                                                 | 2.0                                                                                 | 3.3                                                                                 | 2.1                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 33.5                                                                              | 0.0                                                                               | 20.9                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 18.4                                                                                | 16.3                                                                                | 42.2                                                                                | 8.6                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 582                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 883                                                                                |                                                                                     |                                                                                     | 694                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 31.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 18.0                                                                               |                                                                                     |                                                                                     | 16.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 13.4                                                                              | 37.6                                                                              |                                                                                   | 29.0                                                                              |                                                                                   |                                                                                   | 51.0                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 14.5                                                                              | 27.5                                                                              |                                                                                   | 34.5                                                                              |                                                                                   |                                                                                   | 46.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 9.0                                                                               | 13.9                                                                              |                                                                                   | 22.0                                                                              |                                                                                   |                                                                                   | 8.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.2                                                                               | 4.4                                                                               |                                                                                   | 2.5                                                                               |                                                                                   |                                                                                   | 4.1                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 21.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

10/31/2020

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 11.9 |
| Intersection LOS          | B    |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 82                                                                                | 117                                                                               | 39   | 41                                                                                | 144                                                                               | 31   | 31   | 91                                                                                  | 23   | 22   | 124                                                                                 | 33   |
| Future Vol, veh/h   | 82                                                                                | 117                                                                               | 39   | 41                                                                                | 144                                                                               | 31   | 31   | 91                                                                                  | 23   | 22   | 124                                                                                 | 33   |
| Peak Hour Factor    | 0.79                                                                              | 0.79                                                                              | 0.79 | 0.79                                                                              | 0.79                                                                              | 0.79 | 0.79 | 0.79                                                                                | 0.79 | 0.79 | 0.79                                                                                | 0.79 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 104                                                                               | 148                                                                               | 49   | 52                                                                                | 182                                                                               | 39   | 39   | 115                                                                                 | 29   | 28   | 157                                                                                 | 42   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 2    | 2    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 2    | 2    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 2    | 2    |
| HCM Control Delay          | 11.6 | 12.2 | 11.6 | 12.3 |
| HCM LOS                    | B    | B    | B    | B    |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 21%   | 100%  | 0%    | 100%  | 0%    | 12%   |
| Vol Thru, %            | 63%   | 0%    | 75%   | 0%    | 82%   | 69%   |
| Vol Right, %           | 16%   | 0%    | 25%   | 0%    | 18%   | 18%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 145   | 82    | 156   | 41    | 175   | 179   |
| LT Vol                 | 31    | 82    | 0     | 41    | 0     | 22    |
| Through Vol            | 91    | 0     | 117   | 0     | 144   | 124   |
| RT Vol                 | 23    | 0     | 39    | 0     | 31    | 33    |
| Lane Flow Rate         | 184   | 104   | 197   | 52    | 222   | 227   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.304 | 0.194 | 0.332 | 0.098 | 0.378 | 0.367 |
| Departure Headway (Hd) | 5.954 | 6.735 | 6.048 | 6.774 | 6.139 | 5.832 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 600   | 531   | 592   | 527   | 583   | 614   |
| Service Time           | 4.025 | 4.499 | 3.811 | 4.539 | 3.904 | 3.9   |
| HCM Lane V/C Ratio     | 0.307 | 0.196 | 0.333 | 0.099 | 0.381 | 0.37  |
| HCM Control Delay      | 11.6  | 11.1  | 11.8  | 10.3  | 12.6  | 12.3  |
| HCM Lane LOS           | B     | B     | B     | B     | B     | B     |
| HCM 95th-tile Q        | 1.3   | 0.7   | 1.4   | 0.3   | 1.8   | 1.7   |

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

10/31/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 16.2 |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      |      |      |      |      |      |      |      |      |      |      |
| Traffic Vol, veh/h       | 0    | 0    | 165  | 0    | 0    | 243  | 0    | 1702 | 94   | 49   | 1890 | 161  |
| Future Vol, veh/h        | 0    | 0    | 165  | 0    | 0    | 243  | 0    | 1702 | 94   | 49   | 1890 | 161  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | -    | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 179  | 0    | 0    | 264  | 0    | 1850 | 102  | 53   | 2054 | 175  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |       | Major2 |      |
|----------------------|--------|---|--------|---|--------|-------|--------|------|
| Conflicting Flow All | -      | - | 1115   | - | -      | 976   | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -     | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -     | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16  | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -     | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -     | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93  | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | ~ 172  | 0 | 0      | ~ 214 | 0      | 131  |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -     | 0      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -     | 0      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -     | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | ~ 172  | - | -      | ~ 214 | -      | 131  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -     | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -     | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -     | -      | -    |

| Approach             | EB    | WB    | NB | SB  |
|----------------------|-------|-------|----|-----|
| HCM Control Delay, s | 135.1 | 184.6 | 0  | 1.2 |
| HCM LOS              | F     | F     |    |     |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1  | SBL   | SBT | SBR |
|-----------------------|-----|-----|-------------|-------|-----|-----|
| Capacity (veh/h)      | -   | -   | 172 214     | 131   | -   | -   |
| HCM Lane V/C Ratio    | -   | -   | 1.043 1.234 | 0.407 | -   | -   |
| HCM Control Delay (s) | -   | -   | 135.1 184.6 | 50.1  | -   | -   |
| HCM Lane LOS          | -   | -   | F F         | F     | -   | -   |
| HCM 95th %tile Q(veh) | -   | -   | 8.7 13.6    | 1.7   | -   | -   |

| Notes                      |                        |                            |                                |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

HCM 6th TWSC  
6: Campus Dr & 6th Street

10/31/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 3.8  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↕    |      |      | ↕    |      |      | ↕    |      |      | ↕    |      |
| Traffic Vol, veh/h       | 12   | 8    | 0    | 0    | 4    | 69   | 0    | 146  | 0    | 61   | 79   | 14   |
| Future Vol, veh/h        | 12   | 8    | 0    | 0    | 4    | 69   | 0    | 146  | 0    | 61   | 79   | 14   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   | 78   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 15   | 10   | 0    | 0    | 5    | 88   | 0    | 187  | 0    | 78   | 101  | 18   |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 500    | 453   | 110    | 458   | 462    | 187   | 119    | 0 | 0 | 187   | 0 | 0 |
| Stage 1              | 266    | 266   | -      | 187   | 187    | -     | -      | - | - | -     | - | - |
| Stage 2              | 234    | 187   | -      | 271   | 275    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.13   | 6.53  | 6.23   | 7.13  | 6.53   | 6.23  | 4.13   | - | - | 4.13  | - | - |
| Critical Hdwy Stg 1  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.527  | 4.027 | 3.327  | 3.527 | 4.027  | 3.327 | 2.227  | - | - | 2.227 | - | - |
| Pot Cap-1 Maneuver   | 480    | 501   | 941    | 511   | 495    | 852   | 1463   | - | - | 1381  | - | - |
| Stage 1              | 737    | 687   | -      | 812   | 743    | -     | -      | - | - | -     | - | - |
| Stage 2              | 767    | 743   | -      | 733   | 681    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 407    | 470   | 941    | 479   | 465    | 852   | 1463   | - | - | 1381  | - | - |
| Mov Cap-2 Maneuver   | 407    | 470   | -      | 479   | 465    | -     | -      | - | - | -     | - | - |
| Stage 1              | 737    | 645   | -      | 812   | 743    | -     | -      | - | - | -     | - | - |
| Stage 2              | 683    | 743   | -      | 677   | 639    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB |  | NB |  | SB  |  |
|----------------------|------|--|----|--|----|--|-----|--|
| HCM Control Delay, s | 13.9 |  | 10 |  | 0  |  | 3.1 |  |
| HCM LOS              | B    |  | B  |  |    |  |     |  |

| Minor Lane/Major Mvmt | NBL  | NBT | NBR | EBLn1WBLn1 | SBL   | SBT | SBR |
|-----------------------|------|-----|-----|------------|-------|-----|-----|
| Capacity (veh/h)      | 1463 | -   | -   | 430 815    | 1381  | -   | -   |
| HCM Lane V/C Ratio    | -    | -   | -   | 0.06 0.115 | 0.057 | -   | -   |
| HCM Control Delay (s) | 0    | -   | -   | 13.9 10    | 7.8   | 0   | -   |
| HCM Lane LOS          | A    | -   | -   | B B        | A A   | -   | -   |
| HCM 95th %tile Q(veh) | 0    | -   | -   | 0.2 0.4    | 0.2   | -   | -   |

| Intersection             |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|--------|------|-----------------------------------------------------------------------------------|------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 2.3    |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL    | EBT  | EBR                                                                               | WBL        | WBT    | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |        |      |  |            |        |  |  |  |      |  |  |      |
| Traffic Vol, veh/h       | 0      | 0    | 68                                                                                | 0          | 0      | 161                                                                               | 98                                                                                | 1070                                                                              | 105  | 107                                                                                 | 1112                                                                                | 8    |
| Future Vol, veh/h        | 0      | 0    | 68                                                                                | 0          | 0      | 161                                                                               | 98                                                                                | 1070                                                                              | 105  | 107                                                                                 | 1112                                                                                | 8    |
| Conflicting Peds, #/hr   | 0      | 0    | 0                                                                                 | 0          | 0      | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop   | Stop | Stop                                                                              | Stop       | Stop   | Stop                                                                              | Free                                                                              | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -      | -    | None                                                                              | -          | -      | None                                                                              | -                                                                                 | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | -      | -    | 0                                                                                 | -          | -      | 0                                                                                 | 75                                                                                | -                                                                                 | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -      | 0    | -                                                                                 | -          | 0      | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -      | 0    | -                                                                                 | -          | 0      | -                                                                                 | -                                                                                 | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 97     | 97   | 97                                                                                | 97         | 97     | 97                                                                                | 97                                                                                | 97                                                                                | 97   | 97                                                                                  | 97                                                                                  | 97   |
| Heavy Vehicles, %        | 3      | 3    | 3                                                                                 | 3          | 3      | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                   | 3                                                                                   | 3    |
| Mvmt Flow                | 0      | 0    | 70                                                                                | 0          | 0      | 166                                                                               | 101                                                                               | 1103                                                                              | 108  | 110                                                                                 | 1146                                                                                | 8    |
|                          |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Major/Minor              | Minor2 |      | Minor1                                                                            |            | Major1 |                                                                                   | Major2                                                                            |                                                                                   |      |                                                                                     |                                                                                     |      |
| Conflicting Flow All     | -      | -    | 577                                                                               | -          | -      | 606                                                                               | 1154                                                                              | 0                                                                                 | 0    | 1211                                                                                | 0                                                                                   | 0    |
| Stage 1                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 2                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Critical Hdwy            | -      | -    | 6.96                                                                              | -          | -      | 6.96                                                                              | 4.16                                                                              | -                                                                                 | -    | 4.16                                                                                | -                                                                                   | -    |
| Critical Hdwy Stg 1      | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Critical Hdwy Stg 2      | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Follow-up Hdwy           | -      | -    | 3.33                                                                              | -          | -      | 3.33                                                                              | 2.23                                                                              | -                                                                                 | -    | 2.23                                                                                | -                                                                                   | -    |
| Pot Cap-1 Maneuver       | 0      | 0    | 457                                                                               | 0          | 0      | 438                                                                               | 595                                                                               | -                                                                                 | -    | 566                                                                                 | -                                                                                   | -    |
| Stage 1                  | 0      | 0    | -                                                                                 | 0          | 0      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 2                  | 0      | 0    | -                                                                                 | 0          | 0      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Platoon blocked, %       |        |      |                                                                                   |            |        |                                                                                   |                                                                                   | -                                                                                 | -    |                                                                                     | -                                                                                   | -    |
| Mov Cap-1 Maneuver       | -      | -    | 457                                                                               | -          | -      | 438                                                                               | 595                                                                               | -                                                                                 | -    | 566                                                                                 | -                                                                                   | -    |
| Mov Cap-2 Maneuver       | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 1                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
| Stage 2                  | -      | -    | -                                                                                 | -          | -      | -                                                                                 | -                                                                                 | -                                                                                 | -    | -                                                                                   | -                                                                                   | -    |
|                          |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Approach                 | EB     |      | WB                                                                                |            | NB     |                                                                                   | SB                                                                                |                                                                                   |      |                                                                                     |                                                                                     |      |
| HCM Control Delay, s     | 14.3   |      | 18.1                                                                              |            | 0.9    |                                                                                   | 1.1                                                                               |                                                                                   |      |                                                                                     |                                                                                     |      |
| HCM LOS                  | B      |      | C                                                                                 |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
|                          |        |      |                                                                                   |            |        |                                                                                   |                                                                                   |                                                                                   |      |                                                                                     |                                                                                     |      |
| Minor Lane/Major Mvmt    | NBL    | NBT  | NBR                                                                               | EBLn1WBLn1 | SBL    | SBT                                                                               | SBR                                                                               |                                                                                   |      |                                                                                     |                                                                                     |      |
| Capacity (veh/h)         | 595    | -    | -                                                                                 | 457        | 438    | 566                                                                               | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM Lane V/C Ratio       | 0.17   | -    | -                                                                                 | 0.153      | 0.379  | 0.195                                                                             | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM Control Delay (s)    | 12.3   | -    | -                                                                                 | 14.3       | 18.1   | 12.9                                                                              | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM Lane LOS             | B      | -    | -                                                                                 | B          | C      | B                                                                                 | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |
| HCM 95th %tile Q(veh)    | 0.6    | -    | -                                                                                 | 0.5        | 1.7    | 0.7                                                                               | -                                                                                 | -                                                                                 |      |                                                                                     |                                                                                     |      |



# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 143                                                                               | 553                                                                               | 46                                                                                | 1247                                                                              | 0                                                                                 | 0                                                                                 | 1331                                                                                | 729                                                                                 | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 143                                                                               | 553                                                                               | 46                                                                                | 1247                                                                              | 0                                                                                 | 0                                                                                 | 1331                                                                                | 729                                                                                 | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 155                                                                               | 601                                                                               | 50                                                                                | 1355                                                                              | 0                                                                                 | 0                                                                                 | 1447                                                                                | 792                                                                                 |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 393                                                                               | 699                                                                               | 71                                                                                | 2376                                                                              | 0                                                                                 | 0                                                                                 | 2051                                                                                | 915                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.22                                                                              | 0.22                                                                              | 0.04                                                                              | 0.67                                                                              | 0.00                                                                              | 0.00                                                                              | 0.58                                                                                | 0.58                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 155                                                                               | 601                                                                               | 50                                                                                | 1355                                                                              | 0                                                                                 | 0                                                                                 | 1447                                                                                | 792                                                                                 |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 6.5                                                                               | 15.9                                                                              | 2.4                                                                               | 17.7                                                                              | 0.0                                                                               | 0.0                                                                               | 25.3                                                                                | 36.8                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 6.5                                                                               | 15.9                                                                              | 2.4                                                                               | 17.7                                                                              | 0.0                                                                               | 0.0                                                                               | 25.3                                                                                | 36.8                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 393                                                                               | 699                                                                               | 71                                                                                | 2376                                                                              | 0                                                                                 | 0                                                                                 | 2051                                                                                | 915                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.39                                                                              | 0.86                                                                              | 0.70                                                                              | 0.57                                                                              | 0.00                                                                              | 0.00                                                                              | 0.71                                                                                | 0.87                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 458                                                                               | 815                                                                               | 112                                                                               | 2376                                                                              | 0                                                                                 | 0                                                                                 | 2051                                                                                | 915                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 28.8                                                                              | 32.4                                                                              | 41.1                                                                              | 7.5                                                                               | 0.0                                                                               | 0.0                                                                               | 12.9                                                                                | 15.3                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 0.6                                                                               | 8.2                                                                               | 11.8                                                                              | 1.0                                                                               | 0.0                                                                               | 0.0                                                                               | 2.1                                                                                 | 10.8                                                                                |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 2.6                                                                               | 6.4                                                                               | 1.3                                                                               | 5.3                                                                               | 0.0                                                                               | 0.0                                                                               | 8.9                                                                                 | 13.5                                                                                |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 29.4                                                                              | 40.6                                                                              | 52.9                                                                              | 8.5                                                                               | 0.0                                                                               | 0.0                                                                               | 14.9                                                                                | 26.1                                                                                |                                                                                     |                                                                                     |
| LnGrp LOS                    | C                                                                                 | D                                                                                 | D                                                                                 | A                                                                                 | A                                                                                 | A                                                                                 | B                                                                                   | C                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 756                                                                               |                                                                                   |                                                                                   | 1405                                                                              |                                                                                   |                                                                                   | 2239                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 38.3                                                                              |                                                                                   |                                                                                   | 10.1                                                                              |                                                                                   |                                                                                   | 18.9                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 63.0                                                                              |                                                                                   | 8.0                                                                               |                                                                                   | 55.0                                                                              |                                                                                   | 23.8                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 58.5                                                                              |                                                                                   | 5.5                                                                               |                                                                                   | 48.5                                                                              |                                                                                   | 22.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 19.7                                                                              |                                                                                   | 4.4                                                                               |                                                                                   | 38.8                                                                              |                                                                                   | 17.9                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 12.9                                                                              |                                                                                   | 0.0                                                                               |                                                                                   | 7.7                                                                               |                                                                                   | 1.4                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 19.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 3: 12th Avenue & SR 198 EB Off Ramps

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 610                                                                               | 0                                                                                 | 49                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 673                                                                                 | 143                                                                                 | 0                                                                                   | 905                                                                                 | 578                                                                                 |
| Future Volume (veh/h)        | 610                                                                               | 0                                                                                 | 49                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 673                                                                                 | 143                                                                                 | 0                                                                                   | 905                                                                                 | 578                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 656                                                                               | 0                                                                                 | 53                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 724                                                                                 | 0                                                                                   | 0                                                                                   | 973                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.93                                                                              | 0.93                                                                              | 0.93                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.93                                                                               | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 808                                                                               | 0                                                                                 | 371                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2287                                                                                |                                                                                     | 0                                                                                   | 2287                                                                                |                                                                                     |
| Arrive On Green              | 0.24                                                                              | 0.00                                                                              | 0.24                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.65                                                                                | 0.00                                                                                | 0.00                                                                                | 0.65                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 656                                                                               | 0                                                                                 | 53                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 724                                                                                 | 0                                                                                   | 0                                                                                   | 973                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 14.1                                                                              | 0.0                                                                               | 2.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 7.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 10.4                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 14.1                                                                              | 0.0                                                                               | 2.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 7.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 10.4                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 808                                                                               | 0                                                                                 | 371                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2287                                                                                |                                                                                     | 0                                                                                   | 2287                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.81                                                                              | 0.00                                                                              | 0.14                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.32                                                                                |                                                                                     | 0.00                                                                                | 0.43                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1343                                                                              | 0                                                                                 | 616                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2287                                                                                |                                                                                     | 0                                                                                   | 2287                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 28.1                                                                              | 0.0                                                                               | 23.5                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.6                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 2.0                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.6                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 5.5                                                                               | 0.0                                                                               | 0.7                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 2.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 3.0                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.1                                                                              | 0.0                                                                               | 23.7                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 7.2                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 709                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 724                                                                                |                                                                                     |                                                                                     | 973                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 6.4                                                                                |                                                                                     |                                                                                     | 7.2                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                  |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 55.0                                                                              |                                                                                   |                                                                                   | 22.9                                                                              |                                                                                   |                                                                                   | 55.0                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 50.5                                                                              |                                                                                   |                                                                                   | 30.5                                                                              |                                                                                   |                                                                                   | 50.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 9.1                                                                               |                                                                                   |                                                                                   | 16.1                                                                              |                                                                                   |                                                                                   | 12.4                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 5.4                                                                               |                                                                                   |                                                                                   | 2.3                                                                               |                                                                                   |                                                                                   | 7.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 13.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 30                                                                                | 740                                                                               | 59                                                                                | 78                                                                                | 820                                                                               | 43                                                                                | 84                                                                                 | 68                                                                                  | 166                                                                                 | 100                                                                                 | 86                                                                                  | 34                                                                                  |
| Future Volume (veh/h)        | 30                                                                                | 740                                                                               | 59                                                                                | 78                                                                                | 820                                                                               | 43                                                                                | 84                                                                                 | 68                                                                                  | 166                                                                                 | 100                                                                                 | 86                                                                                  | 34                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 34                                                                                | 851                                                                               | 68                                                                                | 90                                                                                | 943                                                                               | 49                                                                                | 97                                                                                 | 78                                                                                  | 191                                                                                 | 115                                                                                 | 99                                                                                  | 39                                                                                  |
| Peak Hour Factor             | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                               | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 59                                                                                | 1045                                                                              | 466                                                                               | 116                                                                               | 1158                                                                              | 517                                                                               | 125                                                                                | 155                                                                                 | 380                                                                                 | 147                                                                                 | 627                                                                                 | 531                                                                                 |
| Arrive On Green              | 0.03                                                                              | 0.30                                                                              | 0.30                                                                              | 0.07                                                                              | 0.33                                                                              | 0.33                                                                              | 0.07                                                                               | 0.33                                                                                | 0.33                                                                                | 0.08                                                                                | 0.34                                                                                | 0.34                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                               | 477                                                                                 | 1168                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 34                                                                                | 851                                                                               | 68                                                                                | 90                                                                                | 943                                                                               | 49                                                                                | 97                                                                                 | 0                                                                                   | 269                                                                                 | 115                                                                                 | 99                                                                                  | 39                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                               | 0                                                                                   | 1645                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.5                                                                               | 17.5                                                                              | 2.5                                                                               | 3.9                                                                               | 19.2                                                                              | 1.7                                                                               | 4.2                                                                                | 0.0                                                                                 | 10.3                                                                                | 5.0                                                                                 | 2.9                                                                                 | 1.3                                                                                 |
| Cycle Q Clear(g_c), s        | 1.5                                                                               | 17.5                                                                              | 2.5                                                                               | 3.9                                                                               | 19.2                                                                              | 1.7                                                                               | 4.2                                                                                | 0.0                                                                                 | 10.3                                                                                | 5.0                                                                                 | 2.9                                                                                 | 1.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 0.71                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 59                                                                                | 1045                                                                              | 466                                                                               | 116                                                                               | 1158                                                                              | 517                                                                               | 125                                                                                | 0                                                                                   | 535                                                                                 | 147                                                                                 | 627                                                                                 | 531                                                                                 |
| V/C Ratio(X)                 | 0.58                                                                              | 0.81                                                                              | 0.15                                                                              | 0.78                                                                              | 0.81                                                                              | 0.09                                                                              | 0.78                                                                               | 0.00                                                                                | 0.50                                                                                | 0.78                                                                                | 0.16                                                                                | 0.07                                                                                |
| Avail Cap(c_a), veh/h        | 113                                                                               | 1237                                                                              | 552                                                                               | 192                                                                               | 1395                                                                              | 622                                                                               | 237                                                                                | 0                                                                                   | 535                                                                                 | 237                                                                                 | 627                                                                                 | 531                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 37.3                                                                              | 25.6                                                                              | 20.3                                                                              | 36.1                                                                              | 24.1                                                                              | 18.2                                                                              | 35.8                                                                               | 0.0                                                                                 | 21.3                                                                                | 35.2                                                                                | 18.1                                                                                | 17.6                                                                                |
| Incr Delay (d2), s/veh       | 8.6                                                                               | 3.7                                                                               | 0.1                                                                               | 10.7                                                                              | 3.2                                                                               | 0.1                                                                               | 9.9                                                                                | 0.0                                                                                 | 3.3                                                                                 | 8.9                                                                                 | 0.5                                                                                 | 0.3                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.8                                                                               | 7.4                                                                               | 0.9                                                                               | 2.0                                                                               | 7.9                                                                               | 0.6                                                                               | 2.1                                                                                | 0.0                                                                                 | 4.3                                                                                 | 2.5                                                                                 | 1.3                                                                                 | 0.5                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 45.9                                                                              | 29.3                                                                              | 20.4                                                                              | 46.7                                                                              | 27.3                                                                              | 18.3                                                                              | 45.7                                                                               | 0.0                                                                                 | 24.7                                                                                | 44.1                                                                                | 18.7                                                                                | 17.9                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                  | A                                                                                   | C                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 953                                                                               |                                                                                   |                                                                                   | 1082                                                                              |                                                                                   |                                                                                   | 366                                                                                |                                                                                     |                                                                                     | 253                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.2                                                                              |                                                                                   |                                                                                   | 28.5                                                                              |                                                                                   |                                                                                   | 30.2                                                                               |                                                                                     |                                                                                     | 30.1                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 11.0                                                                              | 30.0                                                                              | 9.6                                                                               | 27.7                                                                              | 10.0                                                                              | 31.0                                                                              | 7.1                                                                                | 30.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 10.5                                                                              | 25.5                                                                              | 8.5                                                                               | 27.5                                                                              | 10.5                                                                              | 25.5                                                                              | 5.0                                                                                | 31.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 7.0                                                                               | 12.3                                                                              | 5.9                                                                               | 19.5                                                                              | 6.2                                                                               | 4.9                                                                               | 3.5                                                                                | 21.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 1.3                                                                               | 0.0                                                                               | 3.6                                                                               | 0.1                                                                               | 0.6                                                                               | 0.0                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 29.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 253                                                                               | 292                                                                               | 213                                                                               | 110                                                                               | 317                                                                               | 85                                                                                | 306                                                                                | 680                                                                                 | 57                                                                                  | 92                                                                                  | 578                                                                                 | 105                                                                                 |
| Future Volume (veh/h)        | 253                                                                               | 292                                                                               | 213                                                                               | 110                                                                               | 317                                                                               | 85                                                                                | 306                                                                                | 680                                                                                 | 57                                                                                  | 92                                                                                  | 578                                                                                 | 105                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 278                                                                               | 321                                                                               | 234                                                                               | 121                                                                               | 348                                                                               | 93                                                                                | 336                                                                                | 747                                                                                 | 63                                                                                  | 101                                                                                 | 635                                                                                 | 115                                                                                 |
| Peak Hour Factor             | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                               | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 361                                                                               | 701                                                                               | 313                                                                               | 154                                                                               | 498                                                                               | 131                                                                               | 420                                                                                | 1322                                                                                | 111                                                                                 | 129                                                                                 | 1243                                                                                | 554                                                                                 |
| Arrive On Green              | 0.11                                                                              | 0.20                                                                              | 0.20                                                                              | 0.09                                                                              | 0.18                                                                              | 0.18                                                                              | 0.12                                                                               | 0.40                                                                                | 0.40                                                                                | 0.07                                                                                | 0.35                                                                                | 0.35                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2760                                                                              | 728                                                                               | 3428                                                                               | 3291                                                                                | 277                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 278                                                                               | 321                                                                               | 234                                                                               | 121                                                                               | 221                                                                               | 220                                                                               | 336                                                                                | 400                                                                                 | 410                                                                                 | 101                                                                                 | 635                                                                                 | 115                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1725                                                                              | 1714                                                                               | 1763                                                                                | 1806                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 5.9                                                                               | 6.0                                                                               | 10.5                                                                              | 5.0                                                                               | 8.8                                                                               | 9.0                                                                               | 7.2                                                                                | 13.2                                                                                | 13.2                                                                                | 4.2                                                                                 | 10.7                                                                                | 2.5                                                                                 |
| Cycle Q Clear(g_c), s        | 5.9                                                                               | 6.0                                                                               | 10.5                                                                              | 5.0                                                                               | 8.8                                                                               | 9.0                                                                               | 7.2                                                                                | 13.2                                                                                | 13.2                                                                                | 4.2                                                                                 | 10.7                                                                                | 2.5                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.42                                                                              | 1.00                                                                               |                                                                                     | 0.15                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 361                                                                               | 701                                                                               | 313                                                                               | 154                                                                               | 318                                                                               | 311                                                                               | 420                                                                                | 708                                                                                 | 725                                                                                 | 129                                                                                 | 1243                                                                                | 554                                                                                 |
| V/C Ratio(X)                 | 0.77                                                                              | 0.46                                                                              | 0.75                                                                              | 0.79                                                                              | 0.69                                                                              | 0.71                                                                              | 0.80                                                                               | 0.56                                                                                | 0.57                                                                                | 0.78                                                                                | 0.51                                                                                | 0.21                                                                                |
| Avail Cap(c_a), veh/h        | 365                                                                               | 1252                                                                              | 558                                                                               | 219                                                                               | 656                                                                               | 642                                                                               | 433                                                                                | 708                                                                                 | 725                                                                                 | 200                                                                                 | 1243                                                                                | 554                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 32.7                                                                              | 26.6                                                                              | 28.4                                                                              | 33.6                                                                              | 28.9                                                                              | 29.0                                                                              | 32.1                                                                               | 17.4                                                                                | 17.4                                                                                | 34.2                                                                                | 19.2                                                                                | 7.2                                                                                 |
| Incr Delay (d2), s/veh       | 9.6                                                                               | 0.5                                                                               | 3.6                                                                               | 11.6                                                                              | 2.7                                                                               | 3.0                                                                               | 10.0                                                                               | 3.2                                                                                 | 3.2                                                                                 | 10.1                                                                                | 1.5                                                                                 | 0.8                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 2.8                                                                               | 2.5                                                                               | 4.1                                                                               | 2.6                                                                               | 3.8                                                                               | 3.8                                                                               | 3.4                                                                                | 5.5                                                                                 | 5.6                                                                                 | 2.1                                                                                 | 4.3                                                                                 | 1.4                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 42.3                                                                              | 27.0                                                                              | 31.9                                                                              | 45.3                                                                              | 31.6                                                                              | 31.9                                                                              | 42.1                                                                               | 20.7                                                                                | 20.6                                                                                | 44.3                                                                                | 20.7                                                                                | 8.1                                                                                 |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                  | C                                                                                   | C                                                                                   | D                                                                                   | C                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 833                                                                               |                                                                                   |                                                                                   | 562                                                                               |                                                                                   |                                                                                   | 1146                                                                               |                                                                                     |                                                                                     | 851                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 33.5                                                                              |                                                                                   |                                                                                   | 34.7                                                                              |                                                                                   |                                                                                   | 26.9                                                                               |                                                                                     |                                                                                     | 21.8                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.0                                                                              | 34.7                                                                              | 11.0                                                                              | 19.4                                                                              | 13.7                                                                              | 31.0                                                                              | 12.4                                                                               | 18.1                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.5                                                                               | 27.5                                                                              | 9.3                                                                               | 26.7                                                                              | 9.5                                                                               | 26.5                                                                              | 8.0                                                                                | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 6.2                                                                               | 15.2                                                                              | 7.0                                                                               | 12.5                                                                              | 9.2                                                                               | 12.7                                                                              | 7.9                                                                                | 11.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 4.0                                                                               | 0.1                                                                               | 2.4                                                                               | 0.0                                                                               | 3.9                                                                               | 0.0                                                                                | 2.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 28.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 8: 11th Avenue & 7th Street

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 67                                                                                | 200                                                                               | 219                                                                               | 163                                                                               | 175                                                                               | 109                                                                               | 167                                                                                 | 631                                                                                 | 115                                                                                 | 111                                                                                 | 578                                                                                 | 52                                                                                  |
| Future Volume (veh/h)        | 67                                                                                | 200                                                                               | 219                                                                               | 163                                                                               | 175                                                                               | 109                                                                               | 167                                                                                 | 631                                                                                 | 115                                                                                 | 111                                                                                 | 578                                                                                 | 52                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 74                                                                                | 220                                                                               | 241                                                                               | 179                                                                               | 192                                                                               | 120                                                                               | 184                                                                                 | 693                                                                                 | 126                                                                                 | 122                                                                                 | 635                                                                                 | 57                                                                                  |
| Peak Hour Factor             | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 175                                                                               | 351                                                                               | 313                                                                               | 216                                                                               | 574                                                                               | 342                                                                               | 221                                                                                 | 1274                                                                                | 568                                                                                 | 154                                                                                 | 1140                                                                                | 509                                                                                 |
| Arrive On Green              | 0.05                                                                              | 0.20                                                                              | 0.20                                                                              | 0.12                                                                              | 0.27                                                                              | 0.27                                                                              | 0.13                                                                                | 0.36                                                                                | 0.36                                                                                | 0.09                                                                                | 0.32                                                                                | 0.32                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 2125                                                                              | 1266                                                                              | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 74                                                                                | 220                                                                               | 241                                                                               | 179                                                                               | 158                                                                               | 154                                                                               | 184                                                                                 | 693                                                                                 | 126                                                                                 | 122                                                                                 | 635                                                                                 | 57                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1628                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.6                                                                               | 8.9                                                                               | 11.3                                                                              | 7.7                                                                               | 5.6                                                                               | 6.0                                                                               | 8.0                                                                                 | 12.2                                                                                | 2.7                                                                                 | 5.3                                                                                 | 11.6                                                                                | 2.0                                                                                 |
| Cycle Q Clear(g_c), s        | 1.6                                                                               | 8.9                                                                               | 11.3                                                                              | 7.7                                                                               | 5.6                                                                               | 6.0                                                                               | 8.0                                                                                 | 12.2                                                                                | 2.7                                                                                 | 5.3                                                                                 | 11.6                                                                                | 2.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.78                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 175                                                                               | 351                                                                               | 313                                                                               | 216                                                                               | 476                                                                               | 440                                                                               | 221                                                                                 | 1274                                                                                | 568                                                                                 | 154                                                                                 | 1140                                                                                | 509                                                                                 |
| V/C Ratio(X)                 | 0.42                                                                              | 0.63                                                                              | 0.77                                                                              | 0.83                                                                              | 0.33                                                                              | 0.35                                                                              | 0.83                                                                                | 0.54                                                                                | 0.22                                                                                | 0.79                                                                                | 0.56                                                                                | 0.11                                                                                |
| Avail Cap(c_a), veh/h        | 232                                                                               | 586                                                                               | 523                                                                               | 230                                                                               | 696                                                                               | 643                                                                               | 237                                                                                 | 1274                                                                                | 568                                                                                 | 212                                                                                 | 1140                                                                                | 509                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 36.0                                                                              | 28.7                                                                              | 29.6                                                                              | 33.5                                                                              | 22.9                                                                              | 23.0                                                                              | 33.4                                                                                | 19.9                                                                                | 6.9                                                                                 | 35.0                                                                                | 21.8                                                                                | 18.6                                                                                |
| Incr Delay (d2), s/veh       | 1.6                                                                               | 1.8                                                                               | 4.0                                                                               | 20.7                                                                              | 0.4                                                                               | 0.5                                                                               | 20.5                                                                                | 1.7                                                                                 | 0.9                                                                                 | 12.9                                                                                | 2.0                                                                                 | 0.4                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 3.8                                                                               | 4.4                                                                               | 4.5                                                                               | 2.3                                                                               | 2.3                                                                               | 4.5                                                                                 | 4.9                                                                                 | 1.6                                                                                 | 2.7                                                                                 | 4.8                                                                                 | 0.8                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 37.6                                                                              | 30.5                                                                              | 33.6                                                                              | 54.2                                                                              | 23.3                                                                              | 23.5                                                                              | 53.9                                                                                | 21.5                                                                                | 7.8                                                                                 | 47.9                                                                                | 23.8                                                                                | 19.0                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | C                                                                                   | A                                                                                   | D                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 535                                                                               |                                                                                   |                                                                                   | 491                                                                               |                                                                                   |                                                                                   | 1003                                                                                |                                                                                     |                                                                                     | 814                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 32.9                                                                              |                                                                                   |                                                                                   | 34.6                                                                              |                                                                                   |                                                                                   | 25.7                                                                                |                                                                                     |                                                                                     | 27.1                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 11.3                                                                              | 32.8                                                                              | 14.1                                                                              | 20.1                                                                              | 14.3                                                                              | 29.8                                                                              | 8.5                                                                                 | 25.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.4                                                                               | 26.4                                                                              | 10.2                                                                              | 26.0                                                                              | 10.5                                                                              | 25.3                                                                              | 5.3                                                                                 | 30.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 7.3                                                                               | 14.2                                                                              | 9.7                                                                               | 13.3                                                                              | 10.0                                                                              | 13.6                                                                              | 3.6                                                                                 | 8.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 4.0                                                                               | 0.0                                                                               | 2.2                                                                               | 0.0                                                                               | 3.4                                                                               | 0.0                                                                                 | 1.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 29.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

10/31/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 186                                                                               | 0                                                                                 | 188                                                                               | 10                                                                                | 0                                                                                 | 10                                                                                | 239                                                                                 | 1071                                                                                | 3                                                                                   | 8                                                                                   | 1013                                                                                | 148                                                                                 |
| Future Volume (veh/h)        | 186                                                                               | 0                                                                                 | 188                                                                               | 10                                                                                | 0                                                                                 | 10                                                                                | 239                                                                                 | 1071                                                                                | 3                                                                                   | 8                                                                                   | 1013                                                                                | 148                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 192                                                                               | 0                                                                                 | 194                                                                               | 10                                                                                | 0                                                                                 | 10                                                                                | 246                                                                                 | 1104                                                                                | 3                                                                                   | 8                                                                                   | 1044                                                                                | 153                                                                                 |
| Peak Hour Factor             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 344                                                                               | 0                                                                                 | 311                                                                               | 130                                                                               | 23                                                                                | 80                                                                                | 292                                                                                 | 2204                                                                                | 6                                                                                   | 18                                                                                  | 1607                                                                                | 717                                                                                 |
| Arrive On Green              | 0.20                                                                              | 0.00                                                                              | 0.20                                                                              | 0.20                                                                              | 0.00                                                                              | 0.20                                                                              | 0.17                                                                                | 0.61                                                                                | 0.61                                                                                | 0.01                                                                                | 0.46                                                                                | 0.46                                                                                |
| Sat Flow, veh/h              | 1394                                                                              | 0                                                                                 | 1572                                                                              | 289                                                                               | 115                                                                               | 404                                                                               | 1767                                                                                | 3607                                                                                | 10                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 192                                                                               | 0                                                                                 | 194                                                                               | 20                                                                                | 0                                                                                 | 0                                                                                 | 246                                                                                 | 540                                                                                 | 567                                                                                 | 8                                                                                   | 1044                                                                                | 153                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1394                                                                              | 0                                                                                 | 1572                                                                              | 807                                                                               | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1854                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 2.8                                                                               | 0.0                                                                               | 8.4                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 10.1                                                                                | 12.8                                                                                | 12.8                                                                                | 0.3                                                                                 | 17.0                                                                                | 4.4                                                                                 |
| Cycle Q Clear(g_c), s        | 11.3                                                                              | 0.0                                                                               | 8.4                                                                               | 8.5                                                                               | 0.0                                                                               | 0.0                                                                               | 10.1                                                                                | 12.8                                                                                | 12.8                                                                                | 0.3                                                                                 | 17.0                                                                                | 4.4                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.50                                                                              |                                                                                   | 0.50                                                                              | 1.00                                                                                |                                                                                     | 0.01                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 344                                                                               | 0                                                                                 | 311                                                                               | 232                                                                               | 0                                                                                 | 0                                                                                 | 292                                                                                 | 1077                                                                                | 1133                                                                                | 18                                                                                  | 1607                                                                                | 717                                                                                 |
| V/C Ratio(X)                 | 0.56                                                                              | 0.00                                                                              | 0.62                                                                              | 0.09                                                                              | 0.00                                                                              | 0.00                                                                              | 0.84                                                                                | 0.50                                                                                | 0.50                                                                                | 0.44                                                                                | 0.65                                                                                | 0.21                                                                                |
| Avail Cap(c_a), veh/h        | 556                                                                               | 0                                                                                 | 549                                                                               | 436                                                                               | 0                                                                                 | 0                                                                                 | 415                                                                                 | 1077                                                                                | 1133                                                                                | 119                                                                                 | 1607                                                                                | 717                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 28.7                                                                              | 0.0                                                                               | 27.4                                                                              | 24.5                                                                              | 0.0                                                                               | 0.0                                                                               | 30.1                                                                                | 8.1                                                                                 | 8.1                                                                                 | 36.6                                                                                | 15.7                                                                                | 12.2                                                                                |
| Incr Delay (d2), s/veh       | 1.4                                                                               | 0.0                                                                               | 2.1                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 10.3                                                                                | 1.7                                                                                 | 1.6                                                                                 | 16.0                                                                                | 2.0                                                                                 | 0.7                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 0.0                                                                               | 3.2                                                                               | 0.3                                                                               | 0.0                                                                               | 0.0                                                                               | 4.9                                                                                 | 4.5                                                                                 | 4.7                                                                                 | 0.2                                                                                 | 6.7                                                                                 | 1.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.1                                                                              | 0.0                                                                               | 29.4                                                                              | 24.7                                                                              | 0.0                                                                               | 0.0                                                                               | 40.5                                                                                | 9.8                                                                                 | 9.7                                                                                 | 52.7                                                                                | 17.7                                                                                | 12.9                                                                                |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | D                                                                                   | A                                                                                   | A                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 386                                                                               |                                                                                   |                                                                                   | 20                                                                                |                                                                                   |                                                                                   | 1353                                                                                |                                                                                     |                                                                                     | 1205                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.8                                                                              |                                                                                   |                                                                                   | 24.7                                                                              |                                                                                   |                                                                                   | 15.3                                                                                |                                                                                     |                                                                                     | 17.3                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 5.3                                                                               | 50.0                                                                              |                                                                                   | 19.2                                                                              | 16.8                                                                              | 38.4                                                                              |                                                                                     | 19.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.0                                                                               | 45.5                                                                              |                                                                                   | 26.0                                                                              | 17.5                                                                              | 33.0                                                                              |                                                                                     | 26.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 2.3                                                                               | 14.8                                                                              |                                                                                   | 13.3                                                                              | 12.1                                                                              | 19.0                                                                              |                                                                                     | 10.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 8.8                                                                               |                                                                                   | 1.5                                                                               | 0.3                                                                               | 6.8                                                                               |                                                                                     | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   |                                                                                   | 18.1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

10/31/2020

|                              |  |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
|------------------------------|------------------------------------------------------------------------------------|------|-----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                | EBT  | EBR | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                    |      |     |  |  |  |  |  |      |      |  |  |
| Traffic Volume (veh/h)       | 0                                                                                  | 0    | 0   | 218                                                                               | 35                                                                                | 261                                                                               | 91                                                                                  | 1045                                                                                | 0    | 0    | 1019                                                                                | 277                                                                                 |
| Future Volume (veh/h)        | 0                                                                                  | 0    | 0   | 218                                                                               | 35                                                                                | 261                                                                               | 91                                                                                  | 1045                                                                                | 0    | 0    | 1019                                                                                | 277                                                                                 |
| Initial Q (Qb), veh          |                                                                                    |      |     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0    | 0    | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00 | 1.00 |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                    |      |     | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |      |      | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                    |      |     | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0    | 0    | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                    |      |     | 229                                                                               | 37                                                                                | 275                                                                               | 96                                                                                  | 1100                                                                                | 0    | 0    | 1073                                                                                | 292                                                                                 |
| Peak Hour Factor             |                                                                                    |      |     | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                | 0.95 | 0.95 | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %         |                                                                                    |      |     | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0    | 0    | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                    |      |     | 377                                                                               | 396                                                                               | 336                                                                               | 123                                                                                 | 2357                                                                                | 0    | 0    | 1902                                                                                | 849                                                                                 |
| Arrive On Green              |                                                                                    |      |     | 0.21                                                                              | 0.21                                                                              | 0.21                                                                              | 0.07                                                                                | 0.67                                                                                | 0.00 | 0.00 | 0.54                                                                                | 0.54                                                                                |
| Sat Flow, veh/h              |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0    | 0    | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                    |      |     | 229                                                                               | 37                                                                                | 275                                                                               | 96                                                                                  | 1100                                                                                | 0    | 0    | 1073                                                                                | 292                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0    | 0    | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                    |      |     | 8.9                                                                               | 1.2                                                                               | 12.7                                                                              | 4.1                                                                                 | 11.5                                                                                | 0.0  | 0.0  | 15.4                                                                                | 8.0                                                                                 |
| Cycle Q Clear(g_c), s        |                                                                                    |      |     | 8.9                                                                               | 1.2                                                                               | 12.7                                                                              | 4.1                                                                                 | 11.5                                                                                | 0.0  | 0.0  | 15.4                                                                                | 8.0                                                                                 |
| Prop In Lane                 |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00 | 0.00 |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                    |      |     | 377                                                                               | 396                                                                               | 336                                                                               | 123                                                                                 | 2357                                                                                | 0    | 0    | 1902                                                                                | 849                                                                                 |
| V/C Ratio(X)                 |                                                                                    |      |     | 0.61                                                                              | 0.09                                                                              | 0.82                                                                              | 0.78                                                                                | 0.47                                                                                | 0.00 | 0.00 | 0.56                                                                                | 0.34                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                    |      |     | 695                                                                               | 730                                                                               | 618                                                                               | 220                                                                                 | 2357                                                                                | 0    | 0    | 1902                                                                                | 849                                                                                 |
| HCM Platoon Ratio            |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00 | 0.00 | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                    |      |     | 27.1                                                                              | 24.1                                                                              | 28.6                                                                              | 34.9                                                                                | 6.1                                                                                 | 0.0  | 0.0  | 11.6                                                                                | 9.9                                                                                 |
| Incr Delay (d2), s/veh       |                                                                                    |      |     | 1.6                                                                               | 0.1                                                                               | 4.9                                                                               | 10.0                                                                                | 0.7                                                                                 | 0.0  | 0.0  | 1.2                                                                                 | 1.1                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                    |      |     | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0  | 0.0  | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                    |      |     | 3.6                                                                               | 0.5                                                                               | 4.8                                                                               | 2.0                                                                                 | 3.5                                                                                 | 0.0  | 0.0  | 5.5                                                                                 | 2.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                    |      |     | 28.7                                                                              | 24.2                                                                              | 33.5                                                                              | 44.9                                                                                | 6.8                                                                                 | 0.0  | 0.0  | 12.8                                                                                | 11.0                                                                                |
| LnGrp LOS                    |                                                                                    |      |     | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | A                                                                                   | A    | A    | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                    |      |     |                                                                                   | 541                                                                               |                                                                                   |                                                                                     | 1196                                                                                |      |      | 1365                                                                                |                                                                                     |
| Approach Delay, s/veh        |                                                                                    |      |     |                                                                                   | 30.8                                                                              |                                                                                   |                                                                                     | 9.8                                                                                 |      |      | 12.5                                                                                |                                                                                     |
| Approach LOS                 |                                                                                    |      |     |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | A                                                                                   |      |      | B                                                                                   |                                                                                     |
| Timer - Assigned Phs         |                                                                                    | 2    |     |                                                                                   | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |      |      |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                    | 55.5 |     |                                                                                   | 9.8                                                                               | 45.7                                                                              |                                                                                     | 20.8                                                                                |      |      |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                    | 4.5  |     |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |      |      |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                    | 51.0 |     |                                                                                   | 9.5                                                                               | 37.0                                                                              |                                                                                     | 30.0                                                                                |      |      |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s |                                                                                    | 13.5 |     |                                                                                   | 6.1                                                                               | 17.4                                                                              |                                                                                     | 14.7                                                                                |      |      |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                    | 10.3 |     |                                                                                   | 0.1                                                                               | 8.7                                                                               |                                                                                     | 1.6                                                                                 |      |      |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                    |      |     | 14.6                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                    |      |     | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

10/31/2020

|                              |  |      |      |      |     |     |      |      |      |      |      |      |
|------------------------------|------------------------------------------------------------------------------------|------|------|------|-----|-----|------|------|------|------|------|------|
| Movement                     | EBL                                                                                | EBT  | EBR  | WBL  | WBT | WBR | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          |                                                                                    | ↰    | ↱    |      |     |     |      | ↰    | ↱    | ↰    | ↱    | ↰    |
| Traffic Volume (veh/h)       | 369                                                                                | 79   | 75   | 0    | 0   | 0   | 0    | 768  | 203  | 403  | 839  | 0    |
| Future Volume (veh/h)        | 369                                                                                | 79   | 75   | 0    | 0   | 0   | 0    | 768  | 203  | 403  | 839  | 0    |
| Initial Q (Qb), veh          | 0                                                                                  | 0    | 0    |      |     |     | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                               |      | 1.00 |      |     |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00                                                                               | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        | No                                                                                 |      |      |      |     |     | No   |      |      | No   |      |      |
| Adj Sat Flow, veh/h/ln       | 1856                                                                               | 1856 | 1856 |      |     |     | 0    | 1856 | 1856 | 1856 | 1856 | 0    |
| Adj Flow Rate, veh/h         | 384                                                                                | 82   | 78   |      |     |     | 0    | 800  | 211  | 420  | 874  | 0    |
| Peak Hour Factor             | 0.96                                                                               | 0.96 | 0.96 |      |     |     | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, %         | 3                                                                                  | 3    | 3    |      |     |     | 0    | 3    | 3    | 3    | 3    | 0    |
| Cap, veh/h                   | 421                                                                                | 90   | 451  |      |     |     | 0    | 1062 | 474  | 456  | 2153 | 0    |
| Arrive On Green              | 0.29                                                                               | 0.29 | 0.29 |      |     |     | 0.00 | 0.30 | 0.30 | 0.26 | 0.61 | 0.00 |
| Sat Flow, veh/h              | 1469                                                                               | 314  | 1572 |      |     |     | 0    | 3618 | 1572 | 1767 | 3618 | 0    |
| Grp Volume(v), veh/h         | 466                                                                                | 0    | 78   |      |     |     | 0    | 800  | 211  | 420  | 874  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1782                                                                               | 0    | 1572 |      |     |     | 0    | 1763 | 1572 | 1767 | 1763 | 0    |
| Q Serve(g_s), s              | 22.1                                                                               | 0.0  | 3.3  |      |     |     | 0.0  | 18.0 | 9.5  | 20.3 | 11.2 | 0.0  |
| Cycle Q Clear(g_c), s        | 22.1                                                                               | 0.0  | 3.3  |      |     |     | 0.0  | 18.0 | 9.5  | 20.3 | 11.2 | 0.0  |
| Prop In Lane                 | 0.82                                                                               |      | 1.00 |      |     |     | 0.00 |      | 1.00 | 1.00 |      | 0.00 |
| Lane Grp Cap(c), veh/h       | 511                                                                                | 0    | 451  |      |     |     | 0    | 1062 | 474  | 456  | 2153 | 0    |
| V/C Ratio(X)                 | 0.91                                                                               | 0.00 | 0.17 |      |     |     | 0.00 | 0.75 | 0.45 | 0.92 | 0.41 | 0.00 |
| Avail Cap(c_a), veh/h        | 559                                                                                | 0    | 494  |      |     |     | 0    | 1062 | 474  | 494  | 2153 | 0    |
| HCM Platoon Ratio            | 1.00                                                                               | 1.00 | 1.00 |      |     |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00                                                                               | 0.00 | 1.00 |      |     |     | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 30.2                                                                               | 0.0  | 23.5 |      |     |     | 0.0  | 27.7 | 24.7 | 31.6 | 8.8  | 0.0  |
| Incr Delay (d2), s/veh       | 18.5                                                                               | 0.0  | 0.2  |      |     |     | 0.0  | 5.0  | 3.0  | 21.8 | 0.6  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0                                                                                | 0.0  | 0.0  |      |     |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 11.3                                                                               | 0.0  | 1.2  |      |     |     | 0.0  | 7.8  | 3.7  | 11.1 | 4.0  | 0.0  |
| Unsig. Movement Delay, s/veh |                                                                                    |      |      |      |     |     |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 48.7                                                                               | 0.0  | 23.6 |      |     |     | 0.0  | 32.6 | 27.7 | 53.4 | 9.4  | 0.0  |
| LnGrp LOS                    | D                                                                                  | A    | C    |      |     |     | A    | C    | C    | D    | A    | A    |
| Approach Vol, veh/h          | 544                                                                                |      |      |      |     |     | 1011 |      |      | 1294 |      |      |
| Approach Delay, s/veh        | 45.1                                                                               |      |      |      |     |     | 31.6 |      |      | 23.7 |      |      |
| Approach LOS                 | D                                                                                  |      |      |      |     |     | C    |      |      | C    |      |      |
| Timer - Assigned Phs         | 1                                                                                  | 2    |      | 4    |     |     | 6    |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 27.1                                                                               | 30.9 |      | 29.6 |     |     | 58.0 |      |      |      |      |      |
| Change Period (Y+Rc), s      | 4.5                                                                                | 4.5  |      | 4.5  |     |     | 4.5  |      |      |      |      |      |
| Max Green Setting (Gmax), s  | 24.5                                                                               | 24.5 |      | 27.5 |     |     | 53.5 |      |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 22.3                                                                               | 20.0 |      | 24.1 |     |     | 13.2 |      |      |      |      |      |
| Green Ext Time (p_c), s      | 0.3                                                                                | 2.3  |      | 1.0  |     |     | 7.6  |      |      |      |      |      |
| <b>Intersection Summary</b>  |                                                                                    |      |      |      |     |     |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |                                                                                    |      |      | 30.6 |     |     |      |      |      |      |      |      |
| HCM 6th LOS                  |                                                                                    |      |      | C    |     |     |      |      |      |      |      |      |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

10/31/2020

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 23.7 |
| Intersection LOS          | C    |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 70                                                                                | 265                                                                               | 39   | 22                                                                                | 337                                                                               | 40   | 62   | 143                                                                                 | 28   | 88   | 81                                                                                  | 87   |
| Future Vol, veh/h   | 70                                                                                | 265                                                                               | 39   | 22                                                                                | 337                                                                               | 40   | 62   | 143                                                                                 | 28   | 88   | 81                                                                                  | 87   |
| Peak Hour Factor    | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96 | 0.96                                                                                | 0.96 | 0.96 | 0.96                                                                                | 0.96 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 73                                                                                | 276                                                                               | 41   | 23                                                                                | 351                                                                               | 42   | 65   | 149                                                                                 | 29   | 92   | 84                                                                                  | 91   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB   | NB   | SB |
|----------------------------|------|------|------|----|
| Opposing Approach          | WB   | EB   | SB   | NB |
| Opposing Lanes             | 2    | 2    | 1    | 1  |
| Conflicting Approach Left  | SB   | NB   | EB   | WB |
| Conflicting Lanes Left     | 1    | 1    | 2    | 2  |
| Conflicting Approach Right | NB   | SB   | WB   | EB |
| Conflicting Lanes Right    | 1    | 1    | 2    | 2  |
| HCM Control Delay          | 21.2 | 32.3 | 18.3 | 19 |
| HCM LOS                    | C    | D    | C    | C  |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 27%   | 100%  | 0%    | 100%  | 0%    | 34%   |
| Vol Thru, %            | 61%   | 0%    | 87%   | 0%    | 89%   | 32%   |
| Vol Right, %           | 12%   | 0%    | 13%   | 0%    | 11%   | 34%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 233   | 70    | 304   | 22    | 377   | 256   |
| LT Vol                 | 62    | 70    | 0     | 22    | 0     | 88    |
| Through Vol            | 143   | 0     | 265   | 0     | 337   | 81    |
| RT Vol                 | 28    | 0     | 39    | 0     | 40    | 87    |
| Lane Flow Rate         | 243   | 73    | 317   | 23    | 393   | 267   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.51  | 0.163 | 0.654 | 0.05  | 0.8   | 0.546 |
| Departure Headway (Hd) | 7.563 | 8.039 | 7.43  | 7.929 | 7.338 | 7.371 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 476   | 446   | 485   | 451   | 495   | 488   |
| Service Time           | 5.622 | 5.792 | 5.183 | 5.68  | 5.088 | 5.427 |
| HCM Lane V/C Ratio     | 0.511 | 0.164 | 0.654 | 0.051 | 0.794 | 0.547 |
| HCM Control Delay      | 18.3  | 12.4  | 23.2  | 11.1  | 33.5  | 19    |
| HCM Lane LOS           | C     | B     | C     | B     | D     | C     |
| HCM 95th-tile Q        | 2.8   | 0.6   | 4.6   | 0.2   | 7.4   | 3.2   |

# NEAR-TERM WORKSHEETS

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

11/03/2020

| Intersection             |      |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 2.4  |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL  | EBT  | EBR                                                                               | WBL  | WBT  | WBR                                                                               | NBL  | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |      |      |  |      |      |  |      |  |      |  |  |      |
| Traffic Vol, veh/h       | 0    | 0    | 78                                                                                | 0    | 0    | 98                                                                                | 0    | 1281                                                                              | 169  | 67                                                                                  | 841                                                                                 | 108  |
| Future Vol, veh/h        | 0    | 0    | 78                                                                                | 0    | 0    | 98                                                                                | 0    | 1281                                                                              | 169  | 67                                                                                  | 841                                                                                 | 108  |
| Conflicting Peds, #/hr   | 0    | 0    | 0                                                                                 | 0    | 0    | 0                                                                                 | 0    | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop | Stop | Stop                                                                              | Stop | Stop | Stop                                                                              | Free | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -    | -    | None                                                                              | -    | -    | None                                                                              | -    | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | -    | -    | 0                                                                                 | -    | -    | 0                                                                                 | -    | -                                                                                 | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -    | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -    | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 88   | 88   | 88                                                                                | 88   | 88   | 88                                                                                | 88   | 88                                                                                | 88   | 88                                                                                  | 88                                                                                  | 88   |
| Heavy Vehicles, %        | 3    | 3    | 3                                                                                 | 3    | 3    | 3                                                                                 | 3    | 3                                                                                 | 3    | 3                                                                                   | 3                                                                                   | 3    |
| Mvmt Flow                | 0    | 0    | 89                                                                                | 0    | 0    | 111                                                                               | 0    | 1456                                                                              | 192  | 76                                                                                  | 956                                                                                 | 123  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |      |
|----------------------|--------|---|--------|---|--------|------|--------|------|
| Conflicting Flow All | -      | - | 540    | - | -      | 824  | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16 | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93 | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | 414    | 0 | 0      | 270  | 0      | 186  |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | 414    | - | -      | 270  | -      | 186  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |

| Approach             | EB | WB   | NB | SB  |
|----------------------|----|------|----|-----|
| HCM Control Delay, s | 16 | 27.4 | 0  | 2.4 |
| HCM LOS              | C  | D    |    |     |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | -   | -   | 414        | 270   | 186   | -   |
| HCM Lane V/C Ratio    | -   | -   | 0.214      | 0.412 | 0.409 | -   |
| HCM Control Delay (s) | -   | -   | 16         | 27.4  | 37.2  | -   |
| HCM Lane LOS          | -   | -   | C          | D     | E     | -   |
| HCM 95th %tile Q(veh) | -   | -   | 0.8        | 1.9   | 1.8   | -   |

HCM 6th TWSC  
6: Campus Dr & 6th Street

11/03/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 4.1  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      | ↔    |      |      | ↔    |      |      | ↔    |      |      | ↔    |      |
| Traffic Vol, veh/h       | 17   | 14   | 1    | 0    | 11   | 79   | 1    | 57   | 1    | 32   | 146  | 27   |
| Future Vol, veh/h        | 17   | 14   | 1    | 0    | 11   | 79   | 1    | 57   | 1    | 32   | 146  | 27   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 24   | 20   | 1    | 0    | 16   | 113  | 1    | 81   | 1    | 46   | 209  | 39   |

| Major/Minor          | Minor2 |       | Minor1 |       | Major1 |       | Major2 |   |   |       |   |   |
|----------------------|--------|-------|--------|-------|--------|-------|--------|---|---|-------|---|---|
| Conflicting Flow All | 469    | 405   | 229    | 415   | 424    | 82    | 248    | 0 | 0 | 82    | 0 | 0 |
| Stage 1              | 321    | 321   | -      | 84    | 84     | -     | -      | - | - | -     | - | - |
| Stage 2              | 148    | 84    | -      | 331   | 340    | -     | -      | - | - | -     | - | - |
| Critical Hdwy        | 7.13   | 6.53  | 6.23   | 7.13  | 6.53   | 6.23  | 4.13   | - | - | 4.13  | - | - |
| Critical Hdwy Stg 1  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Critical Hdwy Stg 2  | 6.13   | 5.53  | -      | 6.13  | 5.53   | -     | -      | - | - | -     | - | - |
| Follow-up Hdwy       | 3.527  | 4.027 | 3.327  | 3.527 | 4.027  | 3.327 | 2.227  | - | - | 2.227 | - | - |
| Pot Cap-1 Maneuver   | 503    | 533   | 808    | 546   | 520    | 975   | 1312   | - | - | 1509  | - | - |
| Stage 1              | 689    | 650   | -      | 922   | 823    | -     | -      | - | - | -     | - | - |
| Stage 2              | 852    | 823   | -      | 680   | 637    | -     | -      | - | - | -     | - | - |
| Platoon blocked, %   |        |       |        |       |        |       |        | - | - | -     | - | - |
| Mov Cap-1 Maneuver   | 422    | 513   | 808    | 514   | 501    | 975   | 1312   | - | - | 1509  | - | - |
| Mov Cap-2 Maneuver   | 422    | 513   | -      | 514   | 501    | -     | -      | - | - | -     | - | - |
| Stage 1              | 688    | 627   | -      | 921   | 822    | -     | -      | - | - | -     | - | - |
| Stage 2              | 738    | 822   | -      | 633   | 614    | -     | -      | - | - | -     | - | - |

| Approach             | EB   |  | WB  |  | NB  |  | SB  |  |
|----------------------|------|--|-----|--|-----|--|-----|--|
| HCM Control Delay, s | 13.6 |  | 9.8 |  | 0.1 |  | 1.2 |  |
| HCM LOS              | B    |  | A   |  |     |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1  | SBL  | SBT | SBR |
|-----------------------|-------|-----|-----|-------------|------|-----|-----|
| Capacity (veh/h)      | 1312  | -   | -   | 465 874     | 1509 | -   | -   |
| HCM Lane V/C Ratio    | 0.001 | -   | -   | 0.098 0.147 | 0.03 | -   | -   |
| HCM Control Delay (s) | 7.7   | 0   | -   | 13.6 9.8    | 7.5  | 0   | -   |
| HCM Lane LOS          | A     | A   | -   | B A         | A    | A   | -   |
| HCM 95th %tile Q(veh) | 0     | -   | -   | 0.3 0.5     | 0.1  | -   | -   |



| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 1.8  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↗    |      |      | ↗    | ↗    | ↗    |      | ↗    | ↗    |      |
| Traffic Vol, veh/h       | 0    | 0    | 56   | 0    | 0    | 56   | 107  | 841  | 69   | 80   | 586  | 15   |
| Future Vol, veh/h        | 0    | 0    | 56   | 0    | 0    | 56   | 107  | 841  | 69   | 80   | 586  | 15   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | 75   | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   | 87   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 64   | 0    | 0    | 64   | 123  | 967  | 79   | 92   | 674  | 17   |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |   |
|----------------------|--------|---|--------|---|--------|------|--------|---|
| Conflicting Flow All | -      | - | 346    | - | -      | 523  | 691    | 0 |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy        | -      | - | 6.96   | - | -      | 6.96 | 4.16   | - |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | - |
| Follow-up Hdwy       | -      | - | 3.33   | - | -      | 3.33 | 2.23   | - |
| Pot Cap-1 Maneuver   | 0      | 0 | 647    | 0 | 0      | 496  | 893    | - |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | - |
| Mov Cap-1 Maneuver   | -      | - | 647    | - | -      | 496  | 893    | - |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | - |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |

| Approach             | EB   | WB   | NB | SB  |
|----------------------|------|------|----|-----|
| HCM Control Delay, s | 11.2 | 13.3 | 1  | 1.3 |
| HCM LOS              | B    | B    |    |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL  | SBT  | SBR |
|-----------------------|-------|-----|-----|------------|------|------|-----|
| Capacity (veh/h)      | 893   | -   | -   | 647        | 496  | 655  | -   |
| HCM Lane V/C Ratio    | 0.138 | -   | -   | 0.099      | 0.13 | 0.14 | -   |
| HCM Control Delay (s) | 9.7   | -   | -   | 11.2       | 13.3 | 11.4 | -   |
| HCM Lane LOS          | A     | -   | -   | B          | B    | B    | -   |
| HCM 95th %tile Q(veh) | 0.5   | -   | -   | 0.3        | 0.4  | 0.5  | -   |

# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 50                                                                                | 527                                                                               | 55                                                                                | 927                                                                               | 0                                                                                 | 0                                                                                 | 577                                                                                 | 337                                                                                 | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 50                                                                                | 527                                                                               | 55                                                                                | 927                                                                               | 0                                                                                 | 0                                                                                 | 577                                                                                 | 337                                                                                 | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 56                                                                                | 586                                                                               | 61                                                                                | 1030                                                                              | 0                                                                                 | 0                                                                                 | 641                                                                                 | 374                                                                                 |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                                | 0.90                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 413                                                                               | 735                                                                               | 85                                                                                | 2279                                                                              | 0                                                                                 | 0                                                                                 | 1898                                                                                | 847                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.23                                                                              | 0.23                                                                              | 0.05                                                                              | 0.65                                                                              | 0.00                                                                              | 0.00                                                                              | 0.54                                                                                | 0.54                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 56                                                                                | 586                                                                               | 61                                                                                | 1030                                                                              | 0                                                                                 | 0                                                                                 | 641                                                                                 | 374                                                                                 |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 1.9                                                                               | 13.2                                                                              | 2.6                                                                               | 11.0                                                                              | 0.0                                                                               | 0.0                                                                               | 7.7                                                                                 | 10.8                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 1.9                                                                               | 13.2                                                                              | 2.6                                                                               | 11.0                                                                              | 0.0                                                                               | 0.0                                                                               | 7.7                                                                                 | 10.8                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 413                                                                               | 735                                                                               | 85                                                                                | 2279                                                                              | 0                                                                                 | 0                                                                                 | 1898                                                                                | 847                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.14                                                                              | 0.80                                                                              | 0.72                                                                              | 0.45                                                                              | 0.00                                                                              | 0.00                                                                              | 0.34                                                                                | 0.44                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 765                                                                               | 1362                                                                              | 224                                                                               | 2279                                                                              | 0                                                                                 | 0                                                                                 | 1898                                                                                | 847                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 22.8                                                                              | 27.1                                                                              | 35.2                                                                              | 6.6                                                                               | 0.0                                                                               | 0.0                                                                               | 9.8                                                                                 | 10.5                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 0.1                                                                               | 2.0                                                                               | 10.9                                                                              | 0.6                                                                               | 0.0                                                                               | 0.0                                                                               | 0.5                                                                                 | 1.7                                                                                 |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 4.7                                                                               | 1.3                                                                               | 3.1                                                                               | 0.0                                                                               | 0.0                                                                               | 2.6                                                                                 | 3.5                                                                                 |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 22.9                                                                              | 29.1                                                                              | 46.1                                                                              | 7.3                                                                               | 0.0                                                                               | 0.0                                                                               | 10.3                                                                                | 12.2                                                                                |                                                                                     |                                                                                     |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | D                                                                                 | A                                                                                 | A                                                                                 | A                                                                                 | B                                                                                   | B                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 642                                                                               |                                                                                   |                                                                                   | 1091                                                                              |                                                                                   |                                                                                   | 1015                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 28.6                                                                              |                                                                                   |                                                                                   | 9.4                                                                               |                                                                                   |                                                                                   | 11.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | A                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 53.0                                                                              |                                                                                   | 8.1                                                                               |                                                                                   | 44.9                                                                              |                                                                                   | 22.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 48.5                                                                              |                                                                                   | 9.5                                                                               |                                                                                   | 34.5                                                                              |                                                                                   | 32.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 13.0                                                                              |                                                                                   | 4.6                                                                               |                                                                                   | 12.8                                                                              |                                                                                   | 15.2                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 8.4                                                                               |                                                                                   | 0.0                                                                               |                                                                                   | 5.6                                                                               |                                                                                   | 2.4                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 14.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 3: 12th Avenue & SR 198 EB Off Ramps

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                     |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 486                                                                               | 0                                                                                 | 17                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 495                                                                                 | 132                                                                                 | 0                                                                                   | 360                                                                                 | 265                                                                                 |
| Future Volume (veh/h)        | 486                                                                               | 0                                                                                 | 17                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 495                                                                                 | 132                                                                                 | 0                                                                                   | 360                                                                                 | 265                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 540                                                                               | 0                                                                                 | 19                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 550                                                                                 | 0                                                                                   | 0                                                                                   | 400                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 713                                                                               | 0                                                                                 | 327                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2314                                                                                |                                                                                     | 0                                                                                   | 2314                                                                                |                                                                                     |
| Arrive On Green              | 0.21                                                                              | 0.00                                                                              | 0.21                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.66                                                                                | 0.00                                                                                | 0.00                                                                                | 0.66                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 540                                                                               | 0                                                                                 | 19                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 550                                                                                 | 0                                                                                   | 0                                                                                   | 400                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 9.8                                                                               | 0.0                                                                               | 0.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 4.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.9                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 9.8                                                                               | 0.0                                                                               | 0.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 4.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.9                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 713                                                                               | 0                                                                                 | 327                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2314                                                                                |                                                                                     | 0                                                                                   | 2314                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.76                                                                              | 0.00                                                                              | 0.06                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.24                                                                                |                                                                                     | 0.00                                                                                | 0.17                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1939                                                                              | 0                                                                                 | 890                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2314                                                                                |                                                                                     | 0                                                                                   | 2314                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 24.7                                                                              | 0.0                                                                               | 21.0                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 4.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.4                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 1.7                                                                               | 0.0                                                                               | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.2                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 3.7                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 1.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.7                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 26.4                                                                              | 0.0                                                                               | 21.1                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 4.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.6                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                   | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 559                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 550                                                                                 |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 26.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 4.9                                                                                 |                                                                                     |                                                                                     | 4.6                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 48.0                                                                              |                                                                                   |                                                                                   | 18.3                                                                              |                                                                                   |                                                                                   | 48.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 43.5                                                                              |                                                                                   |                                                                                   | 37.5                                                                              |                                                                                   |                                                                                   | 43.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 6.2                                                                               |                                                                                   |                                                                                   | 11.8                                                                              |                                                                                   |                                                                                   | 4.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 3.8                                                                               |                                                                                   |                                                                                   | 2.0                                                                               |                                                                                   |                                                                                   | 2.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 12.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

## Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

11/03/2020

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|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 22                                                                                | 422                                                                               | 75                                                                                | 98                                                                                | 422                                                                               | 47                                                                                | 36                                                                                  | 51                                                                                  | 71                                                                                  | 48                                                                                  | 70                                                                                  | 13                                                                                  |
| Future Volume (veh/h)        | 22                                                                                | 422                                                                               | 75                                                                                | 98                                                                                | 422                                                                               | 47                                                                                | 36                                                                                  | 51                                                                                  | 71                                                                                  | 48                                                                                  | 70                                                                                  | 13                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 24                                                                                | 459                                                                               | 82                                                                                | 107                                                                               | 459                                                                               | 51                                                                                | 39                                                                                  | 55                                                                                  | 77                                                                                  | 52                                                                                  | 76                                                                                  | 14                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 47                                                                                | 648                                                                               | 289                                                                               | 139                                                                               | 831                                                                               | 371                                                                               | 67                                                                                  | 298                                                                                 | 417                                                                                 | 93                                                                                  | 816                                                                                 | 692                                                                                 |
| Arrive On Green              | 0.03                                                                              | 0.18                                                                              | 0.18                                                                              | 0.08                                                                              | 0.24                                                                              | 0.24                                                                              | 0.04                                                                                | 0.43                                                                                | 0.43                                                                                | 0.05                                                                                | 0.44                                                                                | 0.44                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                                | 700                                                                                 | 980                                                                                 | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 24                                                                                | 459                                                                               | 82                                                                                | 107                                                                               | 459                                                                               | 51                                                                                | 39                                                                                  | 0                                                                                   | 132                                                                                 | 52                                                                                  | 76                                                                                  | 14                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                                | 0                                                                                   | 1679                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.9                                                                               | 8.5                                                                               | 3.1                                                                               | 4.1                                                                               | 7.9                                                                               | 1.4                                                                               | 1.5                                                                                 | 0.0                                                                                 | 3.4                                                                                 | 2.0                                                                                 | 1.7                                                                                 | 0.3                                                                                 |
| Cycle Q Clear(g_c), s        | 0.9                                                                               | 8.5                                                                               | 3.1                                                                               | 4.1                                                                               | 7.9                                                                               | 1.4                                                                               | 1.5                                                                                 | 0.0                                                                                 | 3.4                                                                                 | 2.0                                                                                 | 1.7                                                                                 | 0.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.58                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 47                                                                                | 648                                                                               | 289                                                                               | 139                                                                               | 831                                                                               | 371                                                                               | 67                                                                                  | 0                                                                                   | 714                                                                                 | 93                                                                                  | 816                                                                                 | 692                                                                                 |
| V/C Ratio(X)                 | 0.51                                                                              | 0.71                                                                              | 0.28                                                                              | 0.77                                                                              | 0.55                                                                              | 0.14                                                                              | 0.58                                                                                | 0.00                                                                                | 0.18                                                                                | 0.56                                                                                | 0.09                                                                                | 0.02                                                                                |
| Avail Cap(c_a), veh/h        | 166                                                                               | 1042                                                                              | 465                                                                               | 344                                                                               | 1398                                                                              | 624                                                                               | 191                                                                                 | 0                                                                                   | 714                                                                                 | 217                                                                                 | 816                                                                                 | 692                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 33.3                                                                              | 26.5                                                                              | 24.4                                                                              | 31.3                                                                              | 23.3                                                                              | 12.1                                                                              | 32.8                                                                                | 0.0                                                                                 | 12.4                                                                                | 32.1                                                                                | 11.3                                                                                | 11.0                                                                                |
| Incr Delay (d2), s/veh       | 8.2                                                                               | 1.4                                                                               | 0.5                                                                               | 8.7                                                                               | 0.6                                                                               | 0.2                                                                               | 7.7                                                                                 | 0.0                                                                                 | 0.6                                                                                 | 5.2                                                                                 | 0.2                                                                                 | 0.1                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.5                                                                               | 3.5                                                                               | 1.1                                                                               | 2.0                                                                               | 3.1                                                                               | 0.6                                                                               | 0.8                                                                                 | 0.0                                                                                 | 1.3                                                                                 | 1.0                                                                                 | 0.7                                                                                 | 0.1                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 41.5                                                                              | 28.0                                                                              | 24.9                                                                              | 40.0                                                                              | 23.9                                                                              | 12.3                                                                              | 40.5                                                                                | 0.0                                                                                 | 13.0                                                                                | 37.3                                                                                | 11.6                                                                                | 11.0                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                   | A                                                                                   | B                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 565                                                                               |                                                                                   |                                                                                   | 617                                                                               |                                                                                   |                                                                                   | 171                                                                                 |                                                                                     |                                                                                     | 142                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 28.1                                                                              |                                                                                   |                                                                                   | 25.7                                                                              |                                                                                   |                                                                                   | 19.3                                                                                |                                                                                     |                                                                                     | 20.9                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.1                                                                               | 34.0                                                                              | 9.9                                                                               | 17.3                                                                              | 7.1                                                                               | 35.0                                                                              | 6.4                                                                                 | 20.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.5                                                                               | 29.5                                                                              | 13.5                                                                              | 20.5                                                                              | 7.5                                                                               | 30.5                                                                              | 6.5                                                                                 | 27.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 4.0                                                                               | 5.4                                                                               | 6.1                                                                               | 10.5                                                                              | 3.5                                                                               | 3.7                                                                               | 2.9                                                                                 | 9.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.7                                                                               | 0.1                                                                               | 2.3                                                                               | 0.0                                                                               | 0.4                                                                               | 0.0                                                                                 | 2.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 25.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

11/03/2020

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| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 90                                                                                | 190                                                                               | 119                                                                               | 45                                                                                | 243                                                                               | 45                                                                                | 280                                                                                | 486                                                                                 | 54                                                                                  | 66                                                                                  | 554                                                                                 | 142                                                                                 |
| Future Volume (veh/h)        | 90                                                                                | 190                                                                               | 119                                                                               | 45                                                                                | 243                                                                               | 45                                                                                | 280                                                                                | 486                                                                                 | 54                                                                                  | 66                                                                                  | 554                                                                                 | 142                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 100                                                                               | 211                                                                               | 132                                                                               | 50                                                                                | 270                                                                               | 50                                                                                | 311                                                                                | 540                                                                                 | 60                                                                                  | 73                                                                                  | 616                                                                                 | 158                                                                                 |
| Peak Hour Factor             | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                              | 0.90                                                                               | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                | 0.90                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 216                                                                               | 564                                                                               | 251                                                                               | 80                                                                                | 423                                                                               | 77                                                                                | 421                                                                                | 1506                                                                                | 167                                                                                 | 98                                                                                  | 1422                                                                                | 634                                                                                 |
| Arrive On Green              | 0.06                                                                              | 0.16                                                                              | 0.16                                                                              | 0.05                                                                              | 0.14                                                                              | 0.14                                                                              | 0.12                                                                               | 0.47                                                                                | 0.47                                                                                | 0.06                                                                                | 0.40                                                                                | 0.40                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2977                                                                              | 544                                                                               | 3428                                                                               | 3200                                                                                | 355                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 100                                                                               | 211                                                                               | 132                                                                               | 50                                                                                | 158                                                                               | 162                                                                               | 311                                                                                | 297                                                                                 | 303                                                                                 | 73                                                                                  | 616                                                                                 | 158                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1758                                                                              | 1714                                                                               | 1763                                                                                | 1792                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.9                                                                               | 3.6                                                                               | 3.6                                                                               | 1.9                                                                               | 5.7                                                                               | 5.8                                                                               | 5.9                                                                                | 7.2                                                                                 | 7.2                                                                                 | 2.7                                                                                 | 8.5                                                                                 | 4.5                                                                                 |
| Cycle Q Clear(g_c), s        | 1.9                                                                               | 3.6                                                                               | 3.6                                                                               | 1.9                                                                               | 5.7                                                                               | 5.8                                                                               | 5.9                                                                                | 7.2                                                                                 | 7.2                                                                                 | 2.7                                                                                 | 8.5                                                                                 | 4.5                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.31                                                                              | 1.00                                                                               |                                                                                     | 0.20                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 216                                                                               | 564                                                                               | 251                                                                               | 80                                                                                | 250                                                                               | 250                                                                               | 421                                                                                | 830                                                                                 | 843                                                                                 | 98                                                                                  | 1422                                                                                | 634                                                                                 |
| V/C Ratio(X)                 | 0.46                                                                              | 0.37                                                                              | 0.53                                                                              | 0.63                                                                              | 0.63                                                                              | 0.65                                                                              | 0.74                                                                               | 0.36                                                                                | 0.36                                                                                | 0.74                                                                                | 0.43                                                                                | 0.25                                                                                |
| Avail Cap(c_a), veh/h        | 282                                                                               | 1411                                                                              | 629                                                                               | 177                                                                               | 737                                                                               | 735                                                                               | 589                                                                                | 830                                                                                 | 843                                                                                 | 240                                                                                 | 1422                                                                                | 634                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 30.3                                                                              | 25.1                                                                              | 12.4                                                                              | 31.4                                                                              | 27.1                                                                              | 27.1                                                                              | 28.3                                                                               | 11.3                                                                                | 11.3                                                                                | 31.1                                                                                | 14.4                                                                                | 13.2                                                                                |
| Incr Delay (d2), s/veh       | 1.5                                                                               | 0.4                                                                               | 1.7                                                                               | 7.8                                                                               | 2.6                                                                               | 2.8                                                                               | 3.1                                                                                | 1.2                                                                                 | 1.2                                                                                 | 10.6                                                                                | 1.0                                                                                 | 0.9                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.8                                                                               | 1.4                                                                               | 1.9                                                                               | 0.9                                                                               | 2.4                                                                               | 2.5                                                                               | 2.4                                                                                | 2.7                                                                                 | 2.7                                                                                 | 1.4                                                                                 | 3.2                                                                                 | 1.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 31.8                                                                              | 25.5                                                                              | 14.1                                                                              | 39.2                                                                              | 29.7                                                                              | 30.0                                                                              | 31.4                                                                               | 12.5                                                                                | 12.5                                                                                | 41.7                                                                                | 15.4                                                                                | 14.2                                                                                |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | B                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | C                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 443                                                                               |                                                                                   |                                                                                   | 370                                                                               |                                                                                   |                                                                                   | 911                                                                                |                                                                                     |                                                                                     | 847                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 23.6                                                                              |                                                                                   |                                                                                   | 31.1                                                                              |                                                                                   |                                                                                   | 18.9                                                                               |                                                                                     |                                                                                     | 17.4                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.2                                                                               | 36.0                                                                              | 7.5                                                                               | 15.2                                                                              | 12.7                                                                              | 31.5                                                                              | 8.7                                                                                | 14.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.1                                                                               | 29.4                                                                              | 6.7                                                                               | 26.8                                                                              | 11.5                                                                              | 27.0                                                                              | 5.5                                                                                | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 4.7                                                                               | 9.2                                                                               | 3.9                                                                               | 5.6                                                                               | 7.9                                                                               | 10.5                                                                              | 3.9                                                                                | 7.8                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.5                                                                               | 0.0                                                                               | 1.6                                                                               | 0.4                                                                               | 4.2                                                                               | 0.0                                                                                | 1.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 21.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 8: 11th Avenue & 7th Street

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 40                                                                                | 105                                                                               | 71                                                                                | 79                                                                                | 122                                                                               | 52                                                                                | 167                                                                                 | 485                                                                                 | 106                                                                                 | 77                                                                                  | 363                                                                                 | 69                                                                                  |
| Future Volume (veh/h)        | 40                                                                                | 105                                                                               | 71                                                                                | 79                                                                                | 122                                                                               | 52                                                                                | 167                                                                                 | 485                                                                                 | 106                                                                                 | 77                                                                                  | 363                                                                                 | 69                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 45                                                                                | 119                                                                               | 81                                                                                | 90                                                                                | 139                                                                               | 59                                                                                | 190                                                                                 | 551                                                                                 | 120                                                                                 | 88                                                                                  | 412                                                                                 | 78                                                                                  |
| Peak Hour Factor             | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                              | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                | 0.88                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 148                                                                               | 220                                                                               | 139                                                                               | 116                                                                               | 314                                                                               | 128                                                                               | 236                                                                                 | 1692                                                                                | 755                                                                                 | 114                                                                                 | 1447                                                                                | 645                                                                                 |
| Arrive On Green              | 0.04                                                                              | 0.11                                                                              | 0.11                                                                              | 0.07                                                                              | 0.13                                                                              | 0.13                                                                              | 0.13                                                                                | 0.48                                                                                | 0.48                                                                                | 0.06                                                                                | 0.41                                                                                | 0.41                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 2070                                                                              | 1312                                                                              | 1767                                                                              | 2447                                                                              | 993                                                                               | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 45                                                                                | 100                                                                               | 100                                                                               | 90                                                                                | 98                                                                                | 100                                                                               | 190                                                                                 | 551                                                                                 | 120                                                                                 | 88                                                                                  | 412                                                                                 | 78                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1619                                                                              | 1767                                                                              | 1763                                                                              | 1677                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.8                                                                               | 3.4                                                                               | 3.7                                                                               | 3.2                                                                               | 3.3                                                                               | 3.5                                                                               | 6.6                                                                                 | 6.1                                                                                 | 1.6                                                                                 | 3.1                                                                                 | 4.9                                                                                 | 1.9                                                                                 |
| Cycle Q Clear(g_c), s        | 0.8                                                                               | 3.4                                                                               | 3.7                                                                               | 3.2                                                                               | 3.3                                                                               | 3.5                                                                               | 6.6                                                                                 | 6.1                                                                                 | 1.6                                                                                 | 3.1                                                                                 | 4.9                                                                                 | 1.9                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.81                                                                              | 1.00                                                                              |                                                                                   | 0.59                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 148                                                                               | 187                                                                               | 172                                                                               | 116                                                                               | 226                                                                               | 215                                                                               | 236                                                                                 | 1692                                                                                | 755                                                                                 | 114                                                                                 | 1447                                                                                | 645                                                                                 |
| V/C Ratio(X)                 | 0.30                                                                              | 0.53                                                                              | 0.58                                                                              | 0.78                                                                              | 0.43                                                                              | 0.46                                                                              | 0.80                                                                                | 0.33                                                                                | 0.16                                                                                | 0.77                                                                                | 0.28                                                                                | 0.12                                                                                |
| Avail Cap(c_a), veh/h        | 271                                                                               | 723                                                                               | 665                                                                               | 209                                                                               | 793                                                                               | 754                                                                               | 349                                                                                 | 1692                                                                                | 755                                                                                 | 273                                                                                 | 1447                                                                                | 645                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 29.4                                                                              | 26.8                                                                              | 27.0                                                                              | 29.2                                                                              | 25.5                                                                              | 25.6                                                                              | 26.6                                                                                | 10.2                                                                                | 3.4                                                                                 | 29.2                                                                                | 12.5                                                                                | 11.6                                                                                |
| Incr Delay (d2), s/veh       | 1.1                                                                               | 2.4                                                                               | 3.1                                                                               | 10.7                                                                              | 1.3                                                                               | 1.5                                                                               | 8.2                                                                                 | 0.5                                                                                 | 0.5                                                                                 | 10.7                                                                                | 0.5                                                                                 | 0.4                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.3                                                                               | 1.5                                                                               | 1.5                                                                               | 1.7                                                                               | 1.4                                                                               | 1.4                                                                               | 3.1                                                                                 | 2.1                                                                                 | 0.9                                                                                 | 1.6                                                                                 | 1.8                                                                                 | 0.7                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.5                                                                              | 29.2                                                                              | 30.1                                                                              | 39.8                                                                              | 26.8                                                                              | 27.1                                                                              | 34.8                                                                                | 10.7                                                                                | 3.8                                                                                 | 39.8                                                                                | 13.0                                                                                | 12.0                                                                                |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | C                                                                                   | B                                                                                   | A                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   | 245                                                                               |                                                                                   |                                                                                   | 288                                                                               |                                                                                   |                                                                                     | 861                                                                                 |                                                                                     |                                                                                     | 578                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   | 29.8                                                                              |                                                                                   |                                                                                   | 31.0                                                                              |                                                                                   |                                                                                     | 15.0                                                                                |                                                                                     |                                                                                     | 16.9                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 8.6                                                                               | 34.9                                                                              | 8.6                                                                               | 11.2                                                                              | 13.0                                                                              | 30.5                                                                              | 7.2                                                                                 | 12.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.8                                                                               | 28.7                                                                              | 7.5                                                                               | 26.0                                                                              | 12.5                                                                              | 26.0                                                                              | 5.0                                                                                 | 28.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 5.1                                                                               | 8.1                                                                               | 5.2                                                                               | 5.7                                                                               | 8.6                                                                               | 6.9                                                                               | 2.8                                                                                 | 5.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 3.9                                                                               | 0.0                                                                               | 1.0                                                                               | 0.2                                                                               | 2.7                                                                               | 0.0                                                                                 | 1.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   |                                                                                   | 19.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

11/03/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 40                                                                                | 0                                                                                 | 60                                                                                | 4                                                                                 | 0                                                                                 | 5                                                                                 | 169                                                                                 | 971                                                                                 | 25                                                                                  | 1                                                                                   | 544                                                                                 | 98                                                                                  |
| Future Volume (veh/h)        | 40                                                                                | 0                                                                                 | 60                                                                                | 4                                                                                 | 0                                                                                 | 5                                                                                 | 169                                                                                 | 971                                                                                 | 25                                                                                  | 1                                                                                   | 544                                                                                 | 98                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 47                                                                                | 0                                                                                 | 70                                                                                | 5                                                                                 | 0                                                                                 | 6                                                                                 | 197                                                                                 | 1129                                                                                | 29                                                                                  | 1                                                                                   | 633                                                                                 | 114                                                                                 |
| Peak Hour Factor             | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                | 0.86                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 234                                                                               | 0                                                                                 | 116                                                                               | 103                                                                               | 22                                                                                | 51                                                                                | 250                                                                                 | 2493                                                                                | 64                                                                                  | 3                                                                                   | 2008                                                                                | 896                                                                                 |
| Arrive On Green              | 0.07                                                                              | 0.00                                                                              | 0.07                                                                              | 0.07                                                                              | 0.00                                                                              | 0.07                                                                              | 0.14                                                                                | 0.71                                                                                | 0.71                                                                                | 0.00                                                                                | 0.57                                                                                | 0.57                                                                                |
| Sat Flow, veh/h              | 1399                                                                              | 0                                                                                 | 1572                                                                              | 272                                                                               | 301                                                                               | 687                                                                               | 1767                                                                                | 3512                                                                                | 90                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 47                                                                                | 0                                                                                 | 70                                                                                | 11                                                                                | 0                                                                                 | 0                                                                                 | 197                                                                                 | 567                                                                                 | 591                                                                                 | 1                                                                                   | 633                                                                                 | 114                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1399                                                                              | 0                                                                                 | 1572                                                                              | 1260                                                                              | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1839                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.0                                                                               | 0.0                                                                               | 2.7                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 6.8                                                                                 | 8.6                                                                                 | 8.6                                                                                 | 0.0                                                                                 | 5.9                                                                                 | 2.1                                                                                 |
| Cycle Q Clear(g_c), s        | 1.6                                                                               | 0.0                                                                               | 2.7                                                                               | 2.7                                                                               | 0.0                                                                               | 0.0                                                                               | 6.8                                                                                 | 8.6                                                                                 | 8.6                                                                                 | 0.0                                                                                 | 5.9                                                                                 | 2.1                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.45                                                                              |                                                                                   | 0.55                                                                              | 1.00                                                                                |                                                                                     | 0.05                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 234                                                                               | 0                                                                                 | 116                                                                               | 176                                                                               | 0                                                                                 | 0                                                                                 | 250                                                                                 | 1251                                                                                | 1305                                                                                | 3                                                                                   | 2008                                                                                | 896                                                                                 |
| V/C Ratio(X)                 | 0.20                                                                              | 0.00                                                                              | 0.61                                                                              | 0.06                                                                              | 0.00                                                                              | 0.00                                                                              | 0.79                                                                                | 0.45                                                                                | 0.45                                                                                | 0.35                                                                                | 0.32                                                                                | 0.13                                                                                |
| Avail Cap(c_a), veh/h        | 722                                                                               | 0                                                                                 | 665                                                                               | 681                                                                               | 0                                                                                 | 0                                                                                 | 606                                                                                 | 1251                                                                                | 1305                                                                                | 155                                                                                 | 2008                                                                                | 896                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 27.6                                                                              | 0.0                                                                               | 28.2                                                                              | 27.1                                                                              | 0.0                                                                               | 0.0                                                                               | 26.0                                                                                | 3.9                                                                                 | 3.9                                                                                 | 31.3                                                                                | 7.1                                                                                 | 6.3                                                                                 |
| Incr Delay (d2), s/veh       | 0.4                                                                               | 0.0                                                                               | 5.0                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 5.4                                                                                 | 1.2                                                                                 | 1.1                                                                                 | 62.4                                                                                | 0.4                                                                                 | 0.3                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 0.0                                                                               | 1.1                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 3.1                                                                                 | 2.2                                                                                 | 2.3                                                                                 | 0.1                                                                                 | 1.9                                                                                 | 0.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 28.1                                                                              | 0.0                                                                               | 33.2                                                                              | 27.2                                                                              | 0.0                                                                               | 0.0                                                                               | 31.4                                                                                | 5.1                                                                                 | 5.0                                                                                 | 93.7                                                                                | 7.5                                                                                 | 6.6                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | C                                                                                   | A                                                                                   | A                                                                                   | F                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 117                                                                               |                                                                                   |                                                                                   | 11                                                                                |                                                                                   |                                                                                   | 1355                                                                                |                                                                                     |                                                                                     | 748                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 31.1                                                                              |                                                                                   |                                                                                   | 27.2                                                                              |                                                                                   |                                                                                   | 8.9                                                                                 |                                                                                     |                                                                                     | 7.5                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 4.6                                                                               | 49.0                                                                              |                                                                                   | 9.1                                                                               | 13.4                                                                              | 40.2                                                                              |                                                                                     | 9.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.5                                                                               | 44.5                                                                              |                                                                                   | 26.5                                                                              | 21.5                                                                              | 28.5                                                                              |                                                                                     | 26.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 2.0                                                                               | 10.6                                                                              |                                                                                   | 4.7                                                                               | 8.8                                                                               | 7.9                                                                               |                                                                                     | 4.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 9.7                                                                               |                                                                                   | 0.5                                                                               | 0.4                                                                               | 4.7                                                                               |                                                                                     | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 9.7                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

11/03/2020

|                              |  |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
|------------------------------|------------------------------------------------------------------------------------|------|-----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                | EBT  | EBR | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                    |      |     |  |  |  |  |  |      |      |  |  |
| Traffic Volume (veh/h)       | 0                                                                                  | 0    | 0   | 128                                                                               | 17                                                                                | 353                                                                               | 56                                                                                  | 820                                                                                 | 0    | 0    | 465                                                                                 | 176                                                                                 |
| Future Volume (veh/h)        | 0                                                                                  | 0    | 0   | 128                                                                               | 17                                                                                | 353                                                                               | 56                                                                                  | 820                                                                                 | 0    | 0    | 465                                                                                 | 176                                                                                 |
| Initial Q (Qb), veh          |                                                                                    |      |     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0    | 0    | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00 | 1.00 |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                    |      |     | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |      |      | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                    |      |     | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0    | 0    | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                    |      |     | 149                                                                               | 20                                                                                | 410                                                                               | 65                                                                                  | 953                                                                                 | 0    | 0    | 541                                                                                 | 205                                                                                 |
| Peak Hour Factor             |                                                                                    |      |     | 0.86                                                                              | 0.86                                                                              | 0.86                                                                              | 0.86                                                                                | 0.86                                                                                | 0.86 | 0.86 | 0.86                                                                                | 0.86                                                                                |
| Percent Heavy Veh, %         |                                                                                    |      |     | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0    | 0    | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                    |      |     | 529                                                                               | 556                                                                               | 471                                                                               | 88                                                                                  | 2038                                                                                | 0    | 0    | 1646                                                                                | 734                                                                                 |
| Arrive On Green              |                                                                                    |      |     | 0.30                                                                              | 0.30                                                                              | 0.30                                                                              | 0.05                                                                                | 0.58                                                                                | 0.00 | 0.00 | 0.47                                                                                | 0.47                                                                                |
| Sat Flow, veh/h              |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0    | 0    | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                    |      |     | 149                                                                               | 20                                                                                | 410                                                                               | 65                                                                                  | 953                                                                                 | 0    | 0    | 541                                                                                 | 205                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0    | 0    | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                    |      |     | 4.7                                                                               | 0.6                                                                               | 18.2                                                                              | 2.7                                                                                 | 11.5                                                                                | 0.0  | 0.0  | 7.1                                                                                 | 5.9                                                                                 |
| Cycle Q Clear(g_c), s        |                                                                                    |      |     | 4.7                                                                               | 0.6                                                                               | 18.2                                                                              | 2.7                                                                                 | 11.5                                                                                | 0.0  | 0.0  | 7.1                                                                                 | 5.9                                                                                 |
| Prop In Lane                 |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00 | 0.00 |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                    |      |     | 529                                                                               | 556                                                                               | 471                                                                               | 88                                                                                  | 2038                                                                                | 0    | 0    | 1646                                                                                | 734                                                                                 |
| V/C Ratio(X)                 |                                                                                    |      |     | 0.28                                                                              | 0.04                                                                              | 0.87                                                                              | 0.74                                                                                | 0.47                                                                                | 0.00 | 0.00 | 0.33                                                                                | 0.28                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                    |      |     | 926                                                                               | 972                                                                               | 824                                                                               | 252                                                                                 | 2038                                                                                | 0    | 0    | 1646                                                                                | 734                                                                                 |
| HCM Platoon Ratio            |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(l)           |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00 | 0.00 | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                    |      |     | 19.7                                                                              | 18.2                                                                              | 24.4                                                                              | 34.4                                                                                | 9.0                                                                                 | 0.0  | 0.0  | 12.3                                                                                | 12.0                                                                                |
| Incr Delay (d2), s/veh       |                                                                                    |      |     | 0.3                                                                               | 0.0                                                                               | 5.1                                                                               | 11.2                                                                                | 0.8                                                                                 | 0.0  | 0.0  | 0.5                                                                                 | 0.9                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                    |      |     | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0  | 0.0  | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                    |      |     | 1.8                                                                               | 0.2                                                                               | 6.6                                                                               | 1.4                                                                                 | 4.0                                                                                 | 0.0  | 0.0  | 2.6                                                                                 | 2.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                    |      |     | 20.0                                                                              | 18.3                                                                              | 29.5                                                                              | 45.7                                                                                | 9.7                                                                                 | 0.0  | 0.0  | 12.9                                                                                | 13.0                                                                                |
| LnGrp LOS                    |                                                                                    |      |     | B                                                                                 | B                                                                                 | C                                                                                 | D                                                                                   | A                                                                                   | A    | A    | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                    |      |     |                                                                                   | 579                                                                               |                                                                                   |                                                                                     | 1018                                                                                |      |      | 746                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                    |      |     |                                                                                   | 26.7                                                                              |                                                                                   |                                                                                     | 12.0                                                                                |      |      | 12.9                                                                                |                                                                                     |
| Approach LOS                 |                                                                                    |      |     |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | B                                                                                   |      |      | B                                                                                   |                                                                                     |
| Timer - Assigned Phs         |                                                                                    | 2    |     |                                                                                   | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |      |      |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                    | 47.0 |     |                                                                                   | 8.2                                                                               | 38.8                                                                              |                                                                                     | 26.5                                                                                |      |      |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                    | 4.5  |     |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |      |      |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                    | 42.5 |     |                                                                                   | 10.5                                                                              | 27.5                                                                              |                                                                                     | 38.5                                                                                |      |      |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s |                                                                                    | 13.5 |     |                                                                                   | 4.7                                                                               | 9.1                                                                               |                                                                                     | 20.2                                                                                |      |      |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                    | 7.9  |     |                                                                                   | 0.0                                                                               | 4.0                                                                               |                                                                                     | 1.8                                                                                 |      |      |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                    |      |     | 15.9                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                    |      |     | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |  |
| Traffic Volume (veh/h)       | 261                                                                               | 152                                                                               | 92                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 618                                                                                 | 145                                                                                 | 133                                                                                 | 463                                                                                 | 0                                                                                   |
| Future Volume (veh/h)        | 261                                                                               | 152                                                                               | 92                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 618                                                                                 | 145                                                                                 | 133                                                                                 | 463                                                                                 | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 326                                                                               | 190                                                                               | 115                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 772                                                                                 | 181                                                                                 | 166                                                                                 | 579                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.80                                                                              | 0.80                                                                              | 0.80                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.80                                                                               | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                | 0.80                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 370                                                                               | 216                                                                               | 512                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1391                                                                                | 621                                                                                 | 204                                                                                 | 1991                                                                                | 0                                                                                   |
| Arrive On Green              | 0.33                                                                              | 0.33                                                                              | 0.33                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.39                                                                                | 0.39                                                                                | 0.12                                                                                | 0.56                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 1136                                                                              | 662                                                                               | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 516                                                                               | 0                                                                                 | 115                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 772                                                                                 | 181                                                                                 | 166                                                                                 | 579                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1799                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 22.3                                                                              | 0.0                                                                               | 4.4                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 14.0                                                                                | 6.5                                                                                 | 7.5                                                                                 | 7.0                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 22.3                                                                              | 0.0                                                                               | 4.4                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 14.0                                                                                | 6.5                                                                                 | 7.5                                                                                 | 7.0                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 0.63                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 586                                                                               | 0                                                                                 | 512                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1391                                                                                | 621                                                                                 | 204                                                                                 | 1991                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 0.88                                                                              | 0.00                                                                              | 0.22                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.55                                                                                | 0.29                                                                                | 0.81                                                                                | 0.29                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 754                                                                               | 0                                                                                 | 659                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1391                                                                                | 621                                                                                 | 311                                                                                 | 1991                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 26.2                                                                              | 0.0                                                                               | 20.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 19.3                                                                                | 17.0                                                                                | 35.5                                                                                | 9.3                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 9.7                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 1.6                                                                                 | 1.2                                                                                 | 9.3                                                                                 | 0.4                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 10.1                                                                              | 0.0                                                                               | 1.5                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 5.5                                                                                 | 2.4                                                                                 | 3.7                                                                                 | 2.6                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 35.9                                                                              | 0.0                                                                               | 20.4                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 20.9                                                                                | 18.2                                                                                | 44.8                                                                                | 9.7                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | D                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | C                                                                                   | B                                                                                   | D                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 631                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | 953                                                                                 |                                                                                     | 745                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 33.1                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | 20.4                                                                                |                                                                                     | 17.5                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | C                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 14.0                                                                              | 37.0                                                                              | 31.3                                                                              |                                                                                   | 51.0                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 14.5                                                                              | 27.5                                                                              | 34.5                                                                              |                                                                                   | 46.5                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 9.5                                                                               | 16.0                                                                              | 24.3                                                                              |                                                                                   | 9.0                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.2                                                                               | 4.3                                                                               | 2.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 22.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

11/03/2020

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 12.6 |
| Intersection LOS          | B    |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 89                                                                                | 127                                                                               | 41   | 43                                                                                | 156                                                                               | 34   | 33   | 96                                                                                  | 24   | 24   | 126                                                                                 | 36   |
| Future Vol, veh/h   | 89                                                                                | 127                                                                               | 41   | 43                                                                                | 156                                                                               | 34   | 33   | 96                                                                                  | 24   | 24   | 126                                                                                 | 36   |
| Peak Hour Factor    | 0.79                                                                              | 0.79                                                                              | 0.79 | 0.79                                                                              | 0.79                                                                              | 0.79 | 0.79 | 0.79                                                                                | 0.79 | 0.79 | 0.79                                                                                | 0.79 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 113                                                                               | 161                                                                               | 52   | 54                                                                                | 197                                                                               | 43   | 42   | 122                                                                                 | 30   | 30   | 159                                                                                 | 46   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB | NB   | SB |
|----------------------------|------|----|------|----|
| Opposing Approach          | WB   | EB | SB   | NB |
| Opposing Lanes             | 2    | 2  | 1    | 1  |
| Conflicting Approach Left  | SB   | NB | EB   | WB |
| Conflicting Lanes Left     | 1    | 1  | 2    | 2  |
| Conflicting Approach Right | NB   | SB | WB   | EB |
| Conflicting Lanes Right    | 1    | 1  | 2    | 2  |
| HCM Control Delay          | 12.2 | 13 | 12.3 | 13 |
| HCM LOS                    | B    | B  | B    | B  |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 22%   | 100%  | 0%    | 100%  | 0%    | 13%   |
| Vol Thru, %            | 63%   | 0%    | 76%   | 0%    | 82%   | 68%   |
| Vol Right, %           | 16%   | 0%    | 24%   | 0%    | 18%   | 19%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 153   | 89    | 168   | 43    | 190   | 186   |
| LT Vol                 | 33    | 89    | 0     | 43    | 0     | 24    |
| Through Vol            | 96    | 0     | 127   | 0     | 156   | 126   |
| RT Vol                 | 24    | 0     | 41    | 0     | 34    | 36    |
| Lane Flow Rate         | 194   | 113   | 213   | 54    | 241   | 235   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.33  | 0.215 | 0.366 | 0.105 | 0.42  | 0.393 |
| Departure Headway (Hd) | 6.137 | 6.877 | 6.193 | 6.92  | 6.283 | 6.006 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 581   | 519   | 576   | 515   | 570   | 593   |
| Service Time           | 4.228 | 4.657 | 3.973 | 4.701 | 4.063 | 4.092 |
| HCM Lane V/C Ratio     | 0.334 | 0.218 | 0.37  | 0.105 | 0.423 | 0.396 |
| HCM Control Delay      | 12.3  | 11.6  | 12.5  | 10.5  | 13.6  | 13    |
| HCM Lane LOS           | B     | B     | B     | B     | B     | B     |
| HCM 95th-tile Q        | 1.4   | 0.8   | 1.7   | 0.3   | 2.1   | 1.9   |

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

11/03/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 24.2 |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↰    |      |      | ↰    |      | ↰↰↰  |      | ↰    | ↰↰↰  |      |
| Traffic Vol, veh/h       | 0    | 0    | 179  | 0    | 0    | 251  | 0    | 1842 | 96   | 52   | 2035 | 174  |
| Future Vol, veh/h        | 0    | 0    | 179  | 0    | 0    | 251  | 0    | 1842 | 96   | 52   | 2035 | 174  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | -    | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 195  | 0    | 0    | 273  | 0    | 2002 | 104  | 57   | 2212 | 189  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |       | Major2 |      |
|----------------------|--------|---|--------|---|--------|-------|--------|------|
| Conflicting Flow All | -      | - | 1201   | - | -      | 1053  | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -     | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -     | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16  | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -     | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -     | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93  | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | ~ 151  | 0 | 0      | ~ 190 | 0      | 109  |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -     | 0      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -     | 0      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -     | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | ~ 151  | - | -      | ~ 190 | -      | 109  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -     | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -     | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -     | -      | -    |

| Approach             | EB    | WB    | NB | SB  |
|----------------------|-------|-------|----|-----|
| HCM Control Delay, s | 228.1 | 269.9 | 0  | 1.6 |
| HCM LOS              | F     | F     |    |     |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | -   | -   | 151        | 190   | 109   | -   |
| HCM Lane V/C Ratio    | -   | -   | 1.289      | 1.436 | 0.519 | -   |
| HCM Control Delay (s) | -   | -   | 228.1      | 269.9 | 69.1  | -   |
| HCM Lane LOS          | -   | -   | F          | F     | F     | -   |
| HCM 95th %tile Q(veh) | -   | -   | 11.7       | 16.5  | 2.4   | -   |

| Notes                      |                        |                            |                                |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |

HCM 6th TWSC  
6: Campus Dr & 6th Street

11/03/2020

| Intersection             |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|--------------------------|--------|-----------------------------------------------------------------------------------|--------|------------|-----------------------------------------------------------------------------------|-------|--------|-----------------------------------------------------------------------------------|------|-------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 4      |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Movement                 | EBL    | EBT                                                                               | EBR    | WBL        | WBT                                                                               | WBR   | NBL    | NBT                                                                               | NBR  | SBL   | SBT                                                                                 | SBR  |
| Lane Configurations      |        |  |        |            |  |       |        |  |      |       |  |      |
| Traffic Vol, veh/h       | 13     | 9                                                                                 | 0      | 0          | 4                                                                                 | 75    | 0      | 146                                                                               | 0    | 66    | 79                                                                                  | 15   |
| Future Vol, veh/h        | 13     | 9                                                                                 | 0      | 0          | 4                                                                                 | 75    | 0      | 146                                                                               | 0    | 66    | 79                                                                                  | 15   |
| Conflicting Peds, #/hr   | 0      | 0                                                                                 | 0      | 0          | 0                                                                                 | 0     | 0      | 0                                                                                 | 0    | 0     | 0                                                                                   | 0    |
| Sign Control             | Stop   | Stop                                                                              | Stop   | Stop       | Stop                                                                              | Stop  | Free   | Free                                                                              | Free | Free  | Free                                                                                | Free |
| RT Channelized           | -      | -                                                                                 | None   | -          | -                                                                                 | None  | -      | -                                                                                 | None | -     | -                                                                                   | None |
| Storage Length           | -      | -                                                                                 | -      | -          | -                                                                                 | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Veh in Median Storage, # | -      | 0                                                                                 | -      | -          | 0                                                                                 | -     | -      | 0                                                                                 | -    | -     | 0                                                                                   | -    |
| Grade, %                 | -      | 0                                                                                 | -      | -          | 0                                                                                 | -     | -      | 0                                                                                 | -    | -     | 0                                                                                   | -    |
| Peak Hour Factor         | 78     | 78                                                                                | 78     | 78         | 78                                                                                | 78    | 78     | 78                                                                                | 78   | 78    | 78                                                                                  | 78   |
| Heavy Vehicles, %        | 3      | 3                                                                                 | 3      | 3          | 3                                                                                 | 3     | 3      | 3                                                                                 | 3    | 3     | 3                                                                                   | 3    |
| Mvmt Flow                | 17     | 12                                                                                | 0      | 0          | 5                                                                                 | 96    | 0      | 187                                                                               | 0    | 85    | 101                                                                                 | 19   |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Major/Minor              | Minor2 |                                                                                   | Minor1 |            | Major1                                                                            |       | Major2 |                                                                                   |      |       |                                                                                     |      |
| Conflicting Flow All     | 519    | 468                                                                               | 111    | 474        | 477                                                                               | 187   | 120    | 0                                                                                 | 0    | 187   | 0                                                                                   | 0    |
| Stage 1                  | 281    | 281                                                                               | -      | 187        | 187                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 238    | 187                                                                               | -      | 287        | 290                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Critical Hdwy            | 7.13   | 6.53                                                                              | 6.23   | 7.13       | 6.53                                                                              | 6.23  | 4.13   | -                                                                                 | -    | 4.13  | -                                                                                   | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53                                                                              | -      | 6.13       | 5.53                                                                              | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53                                                                              | -      | 6.13       | 5.53                                                                              | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Follow-up Hdwy           | 3.527  | 4.027                                                                             | 3.327  | 3.527      | 4.027                                                                             | 3.327 | 2.227  | -                                                                                 | -    | 2.227 | -                                                                                   | -    |
| Pot Cap-1 Maneuver       | 466    | 491                                                                               | 940    | 499        | 486                                                                               | 852   | 1462   | -                                                                                 | -    | 1381  | -                                                                                   | -    |
| Stage 1                  | 724    | 677                                                                               | -      | 812        | 743                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 763    | 743                                                                               | -      | 718        | 670                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Platoon blocked, %       |        |                                                                                   |        |            |                                                                                   |       |        | -                                                                                 | -    |       | -                                                                                   | -    |
| Mov Cap-1 Maneuver       | 389    | 459                                                                               | 940    | 465        | 454                                                                               | 852   | 1462   | -                                                                                 | -    | 1381  | -                                                                                   | -    |
| Mov Cap-2 Maneuver       | 389    | 459                                                                               | -      | 465        | 454                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 1                  | 724    | 632                                                                               | -      | 812        | 743                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 672    | 743                                                                               | -      | 658        | 626                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Approach                 | EB     |                                                                                   | WB     |            | NB                                                                                |       | SB     |                                                                                   |      |       |                                                                                     |      |
| HCM Control Delay, s     | 14.3   |                                                                                   | 10     |            | 0                                                                                 |       | 3.2    |                                                                                   |      |       |                                                                                     |      |
| HCM LOS                  | B      |                                                                                   | B      |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Minor Lane/Major Mvmt    | NBL    | NBT                                                                               | NBR    | EBLn1WBLn1 | SBL                                                                               | SBT   | SBR    |                                                                                   |      |       |                                                                                     |      |
| Capacity (veh/h)         | 1462   | -                                                                                 | -      | 415        | 816                                                                               | 1381  | -      | -                                                                                 |      |       |                                                                                     |      |
| HCM Lane V/C Ratio       | -      | -                                                                                 | -      | 0.068      | 0.124                                                                             | 0.061 | -      | -                                                                                 |      |       |                                                                                     |      |
| HCM Control Delay (s)    | 0      | -                                                                                 | -      | 14.3       | 10                                                                                | 7.8   | 0      | -                                                                                 |      |       |                                                                                     |      |
| HCM Lane LOS             | A      | -                                                                                 | -      | B          | B                                                                                 | A     | A      | -                                                                                 |      |       |                                                                                     |      |
| HCM 95th %tile Q(veh)    | 0      | -                                                                                 | -      | 0.2        | 0.4                                                                               | 0.2   | -      | -                                                                                 |      |       |                                                                                     |      |



| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2.6  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↗    |      |      | ↗    | ↗    | ↗↘   |      | ↗    | ↗↘   |      |
| Traffic Vol, veh/h       | 0    | 0    | 74   | 0    | 0    | 174  | 106  | 1154 | 114  | 116  | 1201 | 9    |
| Future Vol, veh/h        | 0    | 0    | 74   | 0    | 0    | 174  | 106  | 1154 | 114  | 116  | 1201 | 9    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | 75   | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 76   | 0    | 0    | 179  | 109  | 1190 | 118  | 120  | 1238 | 9    |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |   |   |      |   |   |
|----------------------|--------|---|--------|---|--------|------|--------|---|---|------|---|---|
| Conflicting Flow All | -      | - | 624    | - | -      | 654  | 1247   | 0 | 0 | 1308 | 0 | 0 |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Critical Hdwy        | -      | - | 6.96   | - | -      | 6.96 | 4.16   | - | - | 4.16 | - | - |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Follow-up Hdwy       | -      | - | 3.33   | - | -      | 3.33 | 2.23   | - | - | 2.23 | - | - |
| Pot Cap-1 Maneuver   | 0      | 0 | 426    | 0 | 0      | 407  | 549    | - | - | 520  | - | - |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | - | - | -    | - | - |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | - | - | -    | - | - |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Mov Cap-1 Maneuver   | -      | - | 426    | - | -      | 407  | 549    | - | - | 520  | - | - |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |

| Approach             | EB   |  | WB   |  | NB |  | SB  |  |
|----------------------|------|--|------|--|----|--|-----|--|
| HCM Control Delay, s | 15.3 |  | 20.6 |  | 1  |  | 1.2 |  |
| HCM LOS              | C    |  | C    |  |    |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT  | SBR |
|-----------------------|-------|-----|-----|------------|-------|------|-----|
| Capacity (veh/h)      | 549   | -   | -   | 426        | 407   | 520  | -   |
| HCM Lane V/C Ratio    | 0.199 | -   | -   | 0.179      | 0.441 | 0.23 | -   |
| HCM Control Delay (s) | 13.2  | -   | -   | 15.3       | 20.6  | 14   | -   |
| HCM Lane LOS          | B     | -   | -   | C          | C     | B    | -   |
| HCM 95th %tile Q(veh) | 0.7   | -   | -   | 0.6        | 2.2   | 0.9  | -   |

# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 155                                                                               | 597                                                                               | 50                                                                                | 1345                                                                              | 0                                                                                 | 0                                                                                 | 1437                                                                                | 783                                                                                 | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 155                                                                               | 597                                                                               | 50                                                                                | 1345                                                                              | 0                                                                                 | 0                                                                                 | 1437                                                                                | 783                                                                                 | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 168                                                                               | 649                                                                               | 54                                                                                | 1462                                                                              | 0                                                                                 | 0                                                                                 | 1562                                                                                | 851                                                                                 |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 413                                                                               | 735                                                                               | 74                                                                                | 2341                                                                              | 0                                                                                 | 0                                                                                 | 2014                                                                                | 898                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.23                                                                              | 0.23                                                                              | 0.04                                                                              | 0.66                                                                              | 0.00                                                                              | 0.00                                                                              | 0.57                                                                                | 0.57                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 168                                                                               | 649                                                                               | 54                                                                                | 1462                                                                              | 0                                                                                 | 0                                                                                 | 1562                                                                                | 851                                                                                 |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 7.1                                                                               | 17.6                                                                              | 2.7                                                                               | 21.0                                                                              | 0.0                                                                               | 0.0                                                                               | 30.0                                                                                | 44.5                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 7.1                                                                               | 17.6                                                                              | 2.7                                                                               | 21.0                                                                              | 0.0                                                                               | 0.0                                                                               | 30.0                                                                                | 44.5                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 413                                                                               | 735                                                                               | 74                                                                                | 2341                                                                              | 0                                                                                 | 0                                                                                 | 2014                                                                                | 898                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.41                                                                              | 0.88                                                                              | 0.73                                                                              | 0.62                                                                              | 0.00                                                                              | 0.00                                                                              | 0.78                                                                                | 0.95                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 451                                                                               | 803                                                                               | 110                                                                               | 2341                                                                              | 0                                                                                 | 0                                                                                 | 2014                                                                                | 898                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 28.6                                                                              | 32.6                                                                              | 41.7                                                                              | 8.5                                                                               | 0.0                                                                               | 0.0                                                                               | 14.5                                                                                | 17.6                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 0.6                                                                               | 10.7                                                                              | 13.2                                                                              | 1.3                                                                               | 0.0                                                                               | 0.0                                                                               | 3.0                                                                                 | 19.7                                                                                |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 2.9                                                                               | 7.3                                                                               | 1.4                                                                               | 6.5                                                                               | 0.0                                                                               | 0.0                                                                               | 10.9                                                                                | 18.2                                                                                |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 29.2                                                                              | 43.3                                                                              | 54.9                                                                              | 9.8                                                                               | 0.0                                                                               | 0.0                                                                               | 17.5                                                                                | 37.3                                                                                |                                                                                     |                                                                                     |
| LnGrp LOS                    | C                                                                                 | D                                                                                 | D                                                                                 | A                                                                                 | A                                                                                 | A                                                                                 | B                                                                                   | D                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 817                                                                               |                                                                                   |                                                                                   | 1516                                                                              |                                                                                   |                                                                                   | 2413                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 40.4                                                                              |                                                                                   |                                                                                   | 11.4                                                                              |                                                                                   |                                                                                   | 24.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 63.0                                                                              |                                                                                   | 8.2                                                                               |                                                                                   | 54.8                                                                              |                                                                                   | 25.1                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 58.5                                                                              |                                                                                   | 5.5                                                                               |                                                                                   | 48.5                                                                              |                                                                                   | 22.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 23.0                                                                              |                                                                                   | 4.7                                                                               |                                                                                   | 46.5                                                                              |                                                                                   | 19.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 14.1                                                                              |                                                                                   | 0.0                                                                               |                                                                                   | 1.8                                                                               |                                                                                   | 1.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 23.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 3: 12th Avenue & SR 198 EB Off Ramps

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 657                                                                               | 0                                                                                 | 53                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 727                                                                                 | 155                                                                                 | 0                                                                                   | 978                                                                                 | 624                                                                                 |
| Future Volume (veh/h)        | 657                                                                               | 0                                                                                 | 53                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 727                                                                                 | 155                                                                                 | 0                                                                                   | 978                                                                                 | 624                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 706                                                                               | 0                                                                                 | 57                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 782                                                                                 | 0                                                                                   | 0                                                                                   | 1052                                                                                | 0                                                                                   |
| Peak Hour Factor             | 0.93                                                                              | 0.93                                                                              | 0.93                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.93                                                                               | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 857                                                                               | 0                                                                                 | 393                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2245                                                                                |                                                                                     | 0                                                                                   | 2245                                                                                |                                                                                     |
| Arrive On Green              | 0.25                                                                              | 0.00                                                                              | 0.25                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.64                                                                                | 0.00                                                                                | 0.00                                                                                | 0.64                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 706                                                                               | 0                                                                                 | 57                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 782                                                                                 | 0                                                                                   | 0                                                                                   | 1052                                                                                | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 15.4                                                                              | 0.0                                                                               | 2.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 8.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 12.3                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 15.4                                                                              | 0.0                                                                               | 2.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 8.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 12.3                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 857                                                                               | 0                                                                                 | 393                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2245                                                                                |                                                                                     | 0                                                                                   | 2245                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.82                                                                              | 0.00                                                                              | 0.15                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.35                                                                                |                                                                                     | 0.00                                                                                | 0.47                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1318                                                                              | 0                                                                                 | 605                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2245                                                                                |                                                                                     | 0                                                                                   | 2245                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 28.1                                                                              | 0.0                                                                               | 23.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.7                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 7.5                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 2.6                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.7                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 6.1                                                                               | 0.0                                                                               | 0.8                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 2.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 3.7                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.7                                                                              | 0.0                                                                               | 23.3                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 7.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 8.2                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 763                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 782                                                                                |                                                                                     |                                                                                     | 1052                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 30.1                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 7.2                                                                                |                                                                                     |                                                                                     | 8.2                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                  |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 55.0                                                                              |                                                                                   |                                                                                   | 24.3                                                                              |                                                                                   |                                                                                   | 55.0                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 50.5                                                                              |                                                                                   |                                                                                   | 30.5                                                                              |                                                                                   |                                                                                   | 50.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 10.2                                                                              |                                                                                   |                                                                                   | 17.4                                                                              |                                                                                   |                                                                                   | 14.3                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 5.9                                                                               |                                                                                   |                                                                                   | 2.4                                                                               |                                                                                   |                                                                                   | 8.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 14.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 32                                                                                | 801                                                                               | 62                                                                                | 82                                                                                | 888                                                                               | 47                                                                                | 87                                                                                  | 74                                                                                  | 176                                                                                 | 108                                                                                 | 93                                                                                  | 37                                                                                  |
| Future Volume (veh/h)        | 32                                                                                | 801                                                                               | 62                                                                                | 82                                                                                | 888                                                                               | 47                                                                                | 87                                                                                  | 74                                                                                  | 176                                                                                 | 108                                                                                 | 93                                                                                  | 37                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 37                                                                                | 921                                                                               | 71                                                                                | 94                                                                                | 1021                                                                              | 54                                                                                | 100                                                                                 | 85                                                                                  | 202                                                                                 | 124                                                                                 | 107                                                                                 | 43                                                                                  |
| Peak Hour Factor             | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                              | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                | 0.87                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 62                                                                                | 1086                                                                              | 484                                                                               | 120                                                                               | 1203                                                                              | 537                                                                               | 128                                                                                 | 153                                                                                 | 364                                                                                 | 157                                                                                 | 612                                                                                 | 519                                                                                 |
| Arrive On Green              | 0.03                                                                              | 0.31                                                                              | 0.31                                                                              | 0.07                                                                              | 0.34                                                                              | 0.34                                                                              | 0.07                                                                                | 0.31                                                                                | 0.31                                                                                | 0.09                                                                                | 0.33                                                                                | 0.33                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                                | 488                                                                                 | 1159                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 37                                                                                | 921                                                                               | 71                                                                                | 94                                                                                | 1021                                                                              | 54                                                                                | 100                                                                                 | 0                                                                                   | 287                                                                                 | 124                                                                                 | 107                                                                                 | 43                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                                | 0                                                                                   | 1647                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.7                                                                               | 19.9                                                                              | 2.7                                                                               | 4.3                                                                               | 21.8                                                                              | 1.9                                                                               | 4.5                                                                                 | 0.0                                                                                 | 11.8                                                                                | 5.6                                                                                 | 3.3                                                                                 | 1.5                                                                                 |
| Cycle Q Clear(g_c), s        | 1.7                                                                               | 19.9                                                                              | 2.7                                                                               | 4.3                                                                               | 21.8                                                                              | 1.9                                                                               | 4.5                                                                                 | 0.0                                                                                 | 11.8                                                                                | 5.6                                                                                 | 3.3                                                                                 | 1.5                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.70                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 62                                                                                | 1086                                                                              | 484                                                                               | 120                                                                               | 1203                                                                              | 537                                                                               | 128                                                                                 | 0                                                                                   | 517                                                                                 | 157                                                                                 | 612                                                                                 | 519                                                                                 |
| V/C Ratio(X)                 | 0.60                                                                              | 0.85                                                                              | 0.15                                                                              | 0.78                                                                              | 0.85                                                                              | 0.10                                                                              | 0.78                                                                                | 0.00                                                                                | 0.56                                                                                | 0.79                                                                                | 0.17                                                                                | 0.08                                                                                |
| Avail Cap(c_a), veh/h        | 109                                                                               | 1193                                                                              | 532                                                                               | 185                                                                               | 1345                                                                              | 600                                                                               | 228                                                                                 | 0                                                                                   | 517                                                                                 | 228                                                                                 | 612                                                                                 | 519                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 38.7                                                                              | 26.3                                                                              | 20.4                                                                              | 37.3                                                                              | 24.8                                                                              | 18.3                                                                              | 37.0                                                                                | 0.0                                                                                 | 23.2                                                                                | 36.3                                                                                | 19.4                                                                                | 18.8                                                                                |
| Incr Delay (d2), s/veh       | 9.1                                                                               | 5.5                                                                               | 0.1                                                                               | 11.0                                                                              | 4.9                                                                               | 0.1                                                                               | 9.7                                                                                 | 0.0                                                                                 | 4.3                                                                                 | 11.1                                                                                | 0.6                                                                                 | 0.3                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.9                                                                               | 8.6                                                                               | 0.9                                                                               | 2.1                                                                               | 9.3                                                                               | 0.7                                                                               | 2.3                                                                                 | 0.0                                                                                 | 5.0                                                                                 | 2.8                                                                                 | 1.5                                                                                 | 0.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 47.7                                                                              | 31.9                                                                              | 20.5                                                                              | 48.2                                                                              | 29.7                                                                              | 18.3                                                                              | 46.8                                                                                | 0.0                                                                                 | 27.4                                                                                | 47.4                                                                                | 20.0                                                                                | 19.1                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                   | A                                                                                   | C                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 1029                                                                              |                                                                                   | 1169                                                                              |                                                                                   |                                                                                   | 387                                                                               |                                                                                     |                                                                                     | 274                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 31.6                                                                              |                                                                                   | 30.7                                                                              |                                                                                   |                                                                                   | 32.4                                                                              |                                                                                     |                                                                                     | 32.3                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 11.7                                                                              | 30.0                                                                              | 10.0                                                                              | 29.5                                                                              | 10.4                                                                              | 31.3                                                                              | 7.3                                                                                 | 32.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 10.5                                                                              | 25.5                                                                              | 8.5                                                                               | 27.5                                                                              | 10.5                                                                              | 25.5                                                                              | 5.0                                                                                 | 31.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 7.6                                                                               | 13.8                                                                              | 6.3                                                                               | 21.9                                                                              | 6.5                                                                               | 5.3                                                                               | 3.7                                                                                 | 23.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 1.4                                                                               | 0.0                                                                               | 3.0                                                                               | 0.1                                                                               | 0.6                                                                               | 0.0                                                                                 | 3.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 31.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

11/03/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |                                                                                   |   |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 274                                                                               | 314                                                                               | 231                                                                               | 119                                                                               | 342                                                                               | 92                                                                                | 331                                                                                 | 732                                                                                 | 62                                                                                  | 100                                                                                 | 623                                                                                 | 114                                                                                 |
| Future Volume (veh/h)        | 274                                                                               | 314                                                                               | 231                                                                               | 119                                                                               | 342                                                                               | 92                                                                                | 331                                                                                 | 732                                                                                 | 62                                                                                  | 100                                                                                 | 623                                                                                 | 114                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 301                                                                               | 345                                                                               | 254                                                                               | 131                                                                               | 376                                                                               | 101                                                                               | 364                                                                                 | 804                                                                                 | 68                                                                                  | 110                                                                                 | 685                                                                                 | 125                                                                                 |
| Peak Hour Factor             | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 354                                                                               | 742                                                                               | 331                                                                               | 165                                                                               | 552                                                                               | 147                                                                               | 420                                                                                 | 1267                                                                                | 107                                                                                 | 140                                                                                 | 1205                                                                                | 537                                                                                 |
| Arrive On Green              | 0.10                                                                              | 0.21                                                                              | 0.21                                                                              | 0.09                                                                              | 0.20                                                                              | 0.20                                                                              | 0.12                                                                                | 0.39                                                                                | 0.39                                                                                | 0.08                                                                                | 0.34                                                                                | 0.34                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2755                                                                              | 731                                                                               | 3428                                                                                | 3290                                                                                | 278                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 301                                                                               | 345                                                                               | 254                                                                               | 131                                                                               | 239                                                                               | 238                                                                               | 364                                                                                 | 431                                                                                 | 441                                                                                 | 110                                                                                 | 685                                                                                 | 125                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1724                                                                              | 1714                                                                                | 1763                                                                                | 1805                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 6.7                                                                               | 6.6                                                                               | 11.8                                                                              | 5.6                                                                               | 9.7                                                                               | 9.9                                                                               | 8.1                                                                                 | 15.4                                                                                | 15.4                                                                                | 4.7                                                                                 | 12.3                                                                                | 2.9                                                                                 |
| Cycle Q Clear(g_c), s        | 6.7                                                                               | 6.6                                                                               | 11.8                                                                              | 5.6                                                                               | 9.7                                                                               | 9.9                                                                               | 8.1                                                                                 | 15.4                                                                                | 15.4                                                                                | 4.7                                                                                 | 12.3                                                                                | 2.9                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.42                                                                              | 1.00                                                                                |                                                                                     | 0.15                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 354                                                                               | 742                                                                               | 331                                                                               | 165                                                                               | 353                                                                               | 345                                                                               | 420                                                                                 | 679                                                                                 | 695                                                                                 | 140                                                                                 | 1205                                                                                | 537                                                                                 |
| V/C Ratio(X)                 | 0.85                                                                              | 0.47                                                                              | 0.77                                                                              | 0.80                                                                              | 0.68                                                                              | 0.69                                                                              | 0.87                                                                                | 0.63                                                                                | 0.63                                                                                | 0.79                                                                                | 0.57                                                                                | 0.23                                                                                |
| Avail Cap(c_a), veh/h        | 354                                                                               | 1214                                                                              | 542                                                                               | 212                                                                               | 637                                                                               | 623                                                                               | 420                                                                                 | 679                                                                                 | 695                                                                                 | 194                                                                                 | 1205                                                                                | 537                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 34.2                                                                              | 26.8                                                                              | 28.8                                                                              | 34.4                                                                              | 28.7                                                                              | 28.8                                                                              | 33.4                                                                                | 19.4                                                                                | 19.4                                                                                | 35.0                                                                                | 20.8                                                                                | 8.1                                                                                 |
| Incr Delay (d2), s/veh       | 17.6                                                                              | 0.5                                                                               | 3.7                                                                               | 14.8                                                                              | 2.3                                                                               | 2.5                                                                               | 17.1                                                                                | 4.5                                                                                 | 4.4                                                                                 | 13.3                                                                                | 1.9                                                                                 | 1.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 3.5                                                                               | 2.7                                                                               | 4.5                                                                               | 3.0                                                                               | 4.1                                                                               | 4.1                                                                               | 4.2                                                                                 | 6.6                                                                                 | 6.8                                                                                 | 2.5                                                                                 | 5.0                                                                                 | 1.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 51.8                                                                              | 27.2                                                                              | 32.6                                                                              | 49.2                                                                              | 30.9                                                                              | 31.2                                                                              | 50.5                                                                                | 23.9                                                                                | 23.8                                                                                | 48.4                                                                                | 22.8                                                                                | 9.1                                                                                 |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | C                                                                                   | C                                                                                   | D                                                                                   | C                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 900                                                                               |                                                                                   |                                                                                   | 608                                                                               |                                                                                   |                                                                                   | 1236                                                                                |                                                                                     |                                                                                     | 920                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 37.0                                                                              |                                                                                   |                                                                                   | 35.0                                                                              |                                                                                   |                                                                                   | 31.7                                                                                |                                                                                     |                                                                                     | 24.0                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.6                                                                              | 34.4                                                                              | 11.7                                                                              | 20.8                                                                              | 14.0                                                                              | 31.0                                                                              | 12.5                                                                                | 20.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.5                                                                               | 27.5                                                                              | 9.3                                                                               | 26.7                                                                              | 9.5                                                                               | 26.5                                                                              | 8.0                                                                                 | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 6.7                                                                               | 17.4                                                                              | 7.6                                                                               | 13.8                                                                              | 10.1                                                                              | 14.3                                                                              | 8.7                                                                                 | 11.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.8                                                                               | 0.0                                                                               | 2.5                                                                               | 0.0                                                                               | 4.0                                                                               | 0.0                                                                                 | 2.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 31.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 8: 11th Avenue & 7th Street

11/03/2020

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|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 73                                                                                | 215                                                                               | 237                                                                               | 176                                                                               | 188                                                                               | 118                                                                               | 181                                                                                 | 679                                                                                 | 124                                                                                 | 120                                                                                 | 623                                                                                 | 56                                                                                  |
| Future Volume (veh/h)        | 73                                                                                | 215                                                                               | 237                                                                               | 176                                                                               | 188                                                                               | 118                                                                               | 181                                                                                 | 679                                                                                 | 124                                                                                 | 120                                                                                 | 623                                                                                 | 56                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 80                                                                                | 236                                                                               | 260                                                                               | 193                                                                               | 207                                                                               | 130                                                                               | 199                                                                                 | 746                                                                                 | 136                                                                                 | 132                                                                                 | 685                                                                                 | 62                                                                                  |
| Peak Hour Factor             | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                              | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                | 0.91                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 177                                                                               | 369                                                                               | 330                                                                               | 223                                                                               | 601                                                                               | 361                                                                               | 229                                                                                 | 1230                                                                                | 548                                                                                 | 165                                                                                 | 1102                                                                                | 491                                                                                 |
| Arrive On Green              | 0.05                                                                              | 0.21                                                                              | 0.21                                                                              | 0.13                                                                              | 0.28                                                                              | 0.28                                                                              | 0.13                                                                                | 0.35                                                                                | 0.35                                                                                | 0.09                                                                                | 0.31                                                                                | 0.31                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 2118                                                                              | 1272                                                                              | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 80                                                                                | 236                                                                               | 260                                                                               | 193                                                                               | 171                                                                               | 166                                                                               | 199                                                                                 | 746                                                                                 | 136                                                                                 | 132                                                                                 | 685                                                                                 | 62                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1627                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.8                                                                               | 9.9                                                                               | 12.7                                                                              | 8.7                                                                               | 6.2                                                                               | 6.6                                                                               | 8.9                                                                                 | 14.2                                                                                | 3.2                                                                                 | 5.9                                                                                 | 13.4                                                                                | 2.3                                                                                 |
| Cycle Q Clear(g_c), s        | 1.8                                                                               | 9.9                                                                               | 12.7                                                                              | 8.7                                                                               | 6.2                                                                               | 6.6                                                                               | 8.9                                                                                 | 14.2                                                                                | 3.2                                                                                 | 5.9                                                                                 | 13.4                                                                                | 2.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.78                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 177                                                                               | 369                                                                               | 330                                                                               | 223                                                                               | 501                                                                               | 462                                                                               | 229                                                                                 | 1230                                                                                | 548                                                                                 | 165                                                                                 | 1102                                                                                | 491                                                                                 |
| V/C Ratio(X)                 | 0.45                                                                              | 0.64                                                                              | 0.79                                                                              | 0.87                                                                              | 0.34                                                                              | 0.36                                                                              | 0.87                                                                                | 0.61                                                                                | 0.25                                                                                | 0.80                                                                                | 0.62                                                                                | 0.13                                                                                |
| Avail Cap(c_a), veh/h        | 224                                                                               | 566                                                                               | 505                                                                               | 223                                                                               | 673                                                                               | 621                                                                               | 229                                                                                 | 1230                                                                                | 548                                                                                 | 205                                                                                 | 1102                                                                                | 491                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 37.3                                                                              | 29.2                                                                              | 30.3                                                                              | 34.7                                                                              | 23.0                                                                              | 23.1                                                                              | 34.6                                                                                | 21.8                                                                                | 7.6                                                                                 | 36.0                                                                                | 23.8                                                                                | 19.9                                                                                |
| Incr Delay (d2), s/veh       | 1.8                                                                               | 1.8                                                                               | 4.7                                                                               | 28.3                                                                              | 0.4                                                                               | 0.5                                                                               | 27.9                                                                                | 2.2                                                                                 | 1.1                                                                                 | 16.3                                                                                | 2.6                                                                                 | 0.5                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.8                                                                               | 4.2                                                                               | 5.0                                                                               | 5.4                                                                               | 2.6                                                                               | 2.6                                                                               | 5.5                                                                                 | 5.8                                                                                 | 1.9                                                                                 | 3.2                                                                                 | 5.7                                                                                 | 0.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 39.1                                                                              | 31.0                                                                              | 35.0                                                                              | 63.0                                                                              | 23.4                                                                              | 23.6                                                                              | 62.5                                                                                | 24.0                                                                                | 8.7                                                                                 | 52.3                                                                                | 26.4                                                                                | 20.5                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | E                                                                                 | C                                                                                 | C                                                                                 | E                                                                                   | C                                                                                   | A                                                                                   | D                                                                                   | C                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 576                                                                               |                                                                                   |                                                                                   | 530                                                                               |                                                                                   |                                                                                   | 1081                                                                                |                                                                                     |                                                                                     | 879                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 33.9                                                                              |                                                                                   |                                                                                   | 37.9                                                                              |                                                                                   |                                                                                   | 29.2                                                                                |                                                                                     |                                                                                     | 29.9                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 12.1                                                                              | 32.7                                                                              | 14.7                                                                              | 21.5                                                                              | 15.0                                                                              | 29.8                                                                              | 8.7                                                                                 | 27.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.4                                                                               | 26.4                                                                              | 10.2                                                                              | 26.0                                                                              | 10.5                                                                              | 25.3                                                                              | 5.3                                                                                 | 30.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 7.9                                                                               | 16.2                                                                              | 10.7                                                                              | 14.7                                                                              | 10.9                                                                              | 15.4                                                                              | 3.8                                                                                 | 8.6                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.9                                                                               | 0.0                                                                               | 2.3                                                                               | 0.0                                                                               | 3.3                                                                               | 0.0                                                                                 | 2.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 31.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

11/03/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 198                                                                               | 0                                                                                 | 191                                                                               | 11                                                                                | 0                                                                                 | 11                                                                                | 252                                                                                 | 1159                                                                                | 3                                                                                   | 9                                                                                   | 1097                                                                                | 158                                                                                 |
| Future Volume (veh/h)        | 198                                                                               | 0                                                                                 | 191                                                                               | 11                                                                                | 0                                                                                 | 11                                                                                | 252                                                                                 | 1159                                                                                | 3                                                                                   | 9                                                                                   | 1097                                                                                | 158                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 204                                                                               | 0                                                                                 | 197                                                                               | 11                                                                                | 0                                                                                 | 11                                                                                | 260                                                                                 | 1195                                                                                | 3                                                                                   | 9                                                                                   | 1131                                                                                | 163                                                                                 |
| Peak Hour Factor             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 354                                                                               | 0                                                                                 | 324                                                                               | 134                                                                               | 22                                                                                | 85                                                                                | 305                                                                                 | 2177                                                                                | 5                                                                                   | 20                                                                                  | 1558                                                                                | 695                                                                                 |
| Arrive On Green              | 0.21                                                                              | 0.00                                                                              | 0.21                                                                              | 0.21                                                                              | 0.00                                                                              | 0.21                                                                              | 0.17                                                                                | 0.60                                                                                | 0.60                                                                                | 0.01                                                                                | 0.44                                                                                | 0.44                                                                                |
| Sat Flow, veh/h              | 1392                                                                              | 0                                                                                 | 1572                                                                              | 302                                                                               | 109                                                                               | 411                                                                               | 1767                                                                                | 3608                                                                                | 9                                                                                   | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 204                                                                               | 0                                                                                 | 197                                                                               | 22                                                                                | 0                                                                                 | 0                                                                                 | 260                                                                                 | 584                                                                                 | 614                                                                                 | 9                                                                                   | 1131                                                                                | 163                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1392                                                                              | 0                                                                                 | 1572                                                                              | 822                                                                               | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1854                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 3.4                                                                               | 0.0                                                                               | 8.6                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 10.8                                                                                | 14.8                                                                                | 14.8                                                                                | 0.4                                                                                 | 19.9                                                                                | 4.9                                                                                 |
| Cycle Q Clear(g_c), s        | 12.1                                                                              | 0.0                                                                               | 8.6                                                                               | 8.7                                                                               | 0.0                                                                               | 0.0                                                                               | 10.8                                                                                | 14.8                                                                                | 14.8                                                                                | 0.4                                                                                 | 19.9                                                                                | 4.9                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.50                                                                              |                                                                                   | 0.50                                                                              | 1.00                                                                                |                                                                                     | 0.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 354                                                                               | 0                                                                                 | 324                                                                               | 241                                                                               | 0                                                                                 | 0                                                                                 | 305                                                                                 | 1064                                                                                | 1118                                                                                | 20                                                                                  | 1558                                                                                | 695                                                                                 |
| V/C Ratio(X)                 | 0.58                                                                              | 0.00                                                                              | 0.61                                                                              | 0.09                                                                              | 0.00                                                                              | 0.00                                                                              | 0.85                                                                                | 0.55                                                                                | 0.55                                                                                | 0.45                                                                                | 0.73                                                                                | 0.23                                                                                |
| Avail Cap(c_a), veh/h        | 547                                                                               | 0                                                                                 | 542                                                                               | 428                                                                               | 0                                                                                 | 0                                                                                 | 410                                                                                 | 1064                                                                                | 1118                                                                                | 117                                                                                 | 1558                                                                                | 695                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 28.8                                                                              | 0.0                                                                               | 27.2                                                                              | 24.4                                                                              | 0.0                                                                               | 0.0                                                                               | 30.3                                                                                | 8.9                                                                                 | 8.9                                                                                 | 37.0                                                                                | 17.3                                                                                | 13.1                                                                                |
| Incr Delay (d2), s/veh       | 1.5                                                                               | 0.0                                                                               | 1.8                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 12.2                                                                                | 2.0                                                                                 | 1.9                                                                                 | 14.7                                                                                | 3.0                                                                                 | 0.8                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 3.5                                                                               | 0.0                                                                               | 3.3                                                                               | 0.3                                                                               | 0.0                                                                               | 0.0                                                                               | 5.4                                                                                 | 5.4                                                                                 | 5.6                                                                                 | 0.2                                                                                 | 8.0                                                                                 | 1.8                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 30.3                                                                              | 0.0                                                                               | 29.0                                                                              | 24.5                                                                              | 0.0                                                                               | 0.0                                                                               | 42.4                                                                                | 10.9                                                                                | 10.8                                                                                | 51.8                                                                                | 20.3                                                                                | 13.9                                                                                |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | D                                                                                   | B                                                                                   | B                                                                                   | D                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 401                                                                               |                                                                                   |                                                                                   | 22                                                                                |                                                                                   |                                                                                   | 1458                                                                                |                                                                                     |                                                                                     | 1303                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.6                                                                              |                                                                                   |                                                                                   | 24.5                                                                              |                                                                                   |                                                                                   | 16.5                                                                                |                                                                                     |                                                                                     | 19.7                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 |                                                                                   | 4                                                                                 | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 5.4                                                                               | 50.0                                                                              |                                                                                   | 20.1                                                                              | 17.5                                                                              | 37.8                                                                              |                                                                                     | 20.1                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.0                                                                               | 45.5                                                                              |                                                                                   | 26.0                                                                              | 17.5                                                                              | 33.0                                                                              |                                                                                     | 26.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 2.4                                                                               | 16.8                                                                              |                                                                                   | 14.1                                                                              | 12.8                                                                              | 21.9                                                                              |                                                                                     | 10.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 9.7                                                                               |                                                                                   | 1.5                                                                               | 0.3                                                                               | 6.3                                                                               |                                                                                     | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 19.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

11/03/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |                                                                                   |                                                                                   |  |  |  |  |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 0                                                                                 | 0                                                                                 | 0                                                                                 | 236                                                                               | 38                                                                                | 277                                                                               | 99                                                                                  | 1130                                                                                | 0                                                                                   | 0                                                                                   | 1091                                                                                | 300                                                                                 |
| Future Volume (veh/h)        | 0                                                                                 | 0                                                                                 | 0                                                                                 | 236                                                                               | 38                                                                                | 277                                                                               | 99                                                                                  | 1130                                                                                | 0                                                                                   | 0                                                                                   | 1091                                                                                | 300                                                                                 |
| Initial Q (Qb), veh          |                                                                                   |                                                                                   |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                   |                                                                                   |                                                                                   | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                   |                                                                                   |                                                                                   | 248                                                                               | 40                                                                                | 292                                                                               | 104                                                                                 | 1189                                                                                | 0                                                                                   | 0                                                                                   | 1148                                                                                | 316                                                                                 |
| Peak Hour Factor             |                                                                                   |                                                                                   |                                                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %         |                                                                                   |                                                                                   |                                                                                   | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                   |                                                                                   |                                                                                   | 397                                                                               | 416                                                                               | 353                                                                               | 133                                                                                 | 2324                                                                                | 0                                                                                   | 0                                                                                   | 1853                                                                                | 827                                                                                 |
| Arrive On Green              |                                                                                   |                                                                                   |                                                                                   | 0.22                                                                              | 0.22                                                                              | 0.22                                                                              | 0.08                                                                                | 0.66                                                                                | 0.00                                                                                | 0.00                                                                                | 0.53                                                                                | 0.53                                                                                |
| Sat Flow, veh/h              |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                   |                                                                                   |                                                                                   | 248                                                                               | 40                                                                                | 292                                                                               | 104                                                                                 | 1189                                                                                | 0                                                                                   | 0                                                                                   | 1148                                                                                | 316                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                   |                                                                                   |                                                                                   | 9.8                                                                               | 1.3                                                                               | 13.7                                                                              | 4.5                                                                                 | 13.4                                                                                | 0.0                                                                                 | 0.0                                                                                 | 17.7                                                                                | 9.2                                                                                 |
| Cycle Q Clear(g_c), s        |                                                                                   |                                                                                   |                                                                                   | 9.8                                                                               | 1.3                                                                               | 13.7                                                                              | 4.5                                                                                 | 13.4                                                                                | 0.0                                                                                 | 0.0                                                                                 | 17.7                                                                                | 9.2                                                                                 |
| Prop In Lane                 |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                   |                                                                                   |                                                                                   | 397                                                                               | 416                                                                               | 353                                                                               | 133                                                                                 | 2324                                                                                | 0                                                                                   | 0                                                                                   | 1853                                                                                | 827                                                                                 |
| V/C Ratio(X)                 |                                                                                   |                                                                                   |                                                                                   | 0.63                                                                              | 0.10                                                                              | 0.83                                                                              | 0.78                                                                                | 0.51                                                                                | 0.00                                                                                | 0.00                                                                                | 0.62                                                                                | 0.38                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                   |                                                                                   |                                                                                   | 685                                                                               | 720                                                                               | 610                                                                               | 217                                                                                 | 2324                                                                                | 0                                                                                   | 0                                                                                   | 1853                                                                                | 827                                                                                 |
| HCM Platoon Ratio            |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                   |                                                                                   |                                                                                   | 27.1                                                                              | 23.8                                                                              | 28.6                                                                              | 35.1                                                                                | 6.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 12.9                                                                                | 10.9                                                                                |
| Incr Delay (d2), s/veh       |                                                                                   |                                                                                   |                                                                                   | 1.6                                                                               | 0.1                                                                               | 5.0                                                                               | 9.5                                                                                 | 0.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 1.6                                                                                 | 1.3                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                   |                                                                                   |                                                                                   | 4.0                                                                               | 0.5                                                                               | 5.2                                                                               | 2.2                                                                                 | 4.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.4                                                                                 | 3.1                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                   |                                                                                   |                                                                                   | 28.7                                                                              | 23.9                                                                              | 33.5                                                                              | 44.6                                                                                | 7.6                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 14.5                                                                                | 12.2                                                                                |
| LnGrp LOS                    |                                                                                   |                                                                                   |                                                                                   | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | A                                                                                   | A                                                                                   | A                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 580                                                                               |                                                                                   |                                                                                     | 1293                                                                                |                                                                                     |                                                                                     | 1464                                                                                |                                                                                     |
| Approach Delay, s/veh        |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 30.8                                                                              |                                                                                   |                                                                                     | 10.6                                                                                |                                                                                     |                                                                                     | 14.0                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |
| Timer - Assigned Phs         |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 55.5                                                                              |                                                                                   |                                                                                   | 10.3                                                                              | 45.2                                                                              |                                                                                     | 21.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                   | 51.0                                                                              |                                                                                   |                                                                                   | 9.5                                                                               | 37.0                                                                              |                                                                                     | 30.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 15.4                                                                              |                                                                                   |                                                                                   | 6.5                                                                               | 19.7                                                                              |                                                                                     | 15.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                   | 11.4                                                                              |                                                                                   |                                                                                   | 0.1                                                                               | 8.8                                                                               |                                                                                     | 1.7                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   |                                                                                   | 15.6                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/03/2020

|                              |  |      |      |      |     |      |      |      |      |      |      |      |
|------------------------------|------------------------------------------------------------------------------------|------|------|------|-----|------|------|------|------|------|------|------|
| Movement                     | EBL                                                                                | EBT  | EBR  | WBL  | WBT | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          |                                                                                    | ↖    | ↗    |      |     |      |      | ↖    | ↗    | ↖    | ↗    |      |
| Traffic Volume (veh/h)       | 399                                                                                | 86   | 81   | 0    | 0   | 0    | 0    | 830  | 220  | 426  | 906  | 0    |
| Future Volume (veh/h)        | 399                                                                                | 86   | 81   | 0    | 0   | 0    | 0    | 830  | 220  | 426  | 906  | 0    |
| Initial Q (Qb), veh          | 0                                                                                  | 0    | 0    |      |     |      | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                               |      | 1.00 |      |     |      | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             | 1.00                                                                               | 1.00 | 1.00 |      |     |      | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |                                                                                    | No   |      |      |     |      |      | No   |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       | 1856                                                                               | 1856 | 1856 |      |     |      | 0    | 1856 | 1856 | 1856 | 1856 | 0    |
| Adj Flow Rate, veh/h         | 416                                                                                | 90   | 84   |      |     |      | 0    | 865  | 229  | 444  | 944  | 0    |
| Peak Hour Factor             | 0.96                                                                               | 0.96 | 0.96 |      |     |      | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, %         | 3                                                                                  | 3    | 3    |      |     |      | 0    | 3    | 3    | 3    | 3    | 0    |
| Cap, veh/h                   | 443                                                                                | 96   | 475  |      |     |      | 0    | 982  | 438  | 475  | 2106 | 0    |
| Arrive On Green              | 0.30                                                                               | 0.30 | 0.30 |      |     |      | 0.00 | 0.28 | 0.28 | 0.27 | 0.60 | 0.00 |
| Sat Flow, veh/h              | 1465                                                                               | 317  | 1572 |      |     |      | 0    | 3618 | 1572 | 1767 | 3618 | 0    |
| Grp Volume(v), veh/h         | 506                                                                                | 0    | 84   |      |     |      | 0    | 865  | 229  | 444  | 944  | 0    |
| Grp Sat Flow(s),veh/h/ln     | 1782                                                                               | 0    | 1572 |      |     |      | 0    | 1763 | 1572 | 1767 | 1763 | 0    |
| Q Serve(g_s), s              | 24.8                                                                               | 0.0  | 3.5  |      |     |      | 0.0  | 21.0 | 11.0 | 22.0 | 13.2 | 0.0  |
| Cycle Q Clear(g_c), s        | 24.8                                                                               | 0.0  | 3.5  |      |     |      | 0.0  | 21.0 | 11.0 | 22.0 | 13.2 | 0.0  |
| Prop In Lane                 | 0.82                                                                               |      | 1.00 |      |     |      | 0.00 |      | 1.00 | 1.00 |      | 0.00 |
| Lane Grp Cap(c), veh/h       | 538                                                                                | 0    | 475  |      |     |      | 0    | 982  | 438  | 475  | 2106 | 0    |
| V/C Ratio(X)                 | 0.94                                                                               | 0.00 | 0.18 |      |     |      | 0.00 | 0.88 | 0.52 | 0.93 | 0.45 | 0.00 |
| Avail Cap(c_a), veh/h        | 547                                                                                | 0    | 483  |      |     |      | 0    | 982  | 438  | 484  | 2106 | 0    |
| HCM Platoon Ratio            | 1.00                                                                               | 1.00 | 1.00 |      |     |      | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           | 1.00                                                                               | 0.00 | 1.00 |      |     |      | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh     | 30.5                                                                               | 0.0  | 23.0 |      |     |      | 0.0  | 30.9 | 27.3 | 32.0 | 9.9  | 0.0  |
| Incr Delay (d2), s/veh       | 24.3                                                                               | 0.0  | 0.2  |      |     |      | 0.0  | 11.2 | 4.4  | 25.4 | 0.7  | 0.0  |
| Initial Q Delay(d3),s/veh    | 0.0                                                                                | 0.0  | 0.0  |      |     |      | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     | 13.4                                                                               | 0.0  | 1.2  |      |     |      | 0.0  | 9.9  | 4.4  | 12.4 | 4.8  | 0.0  |
| Unsig. Movement Delay, s/veh |                                                                                    |      |      |      |     |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         | 54.8                                                                               | 0.0  | 23.2 |      |     |      | 0.0  | 42.1 | 31.7 | 57.3 | 10.6 | 0.0  |
| LnGrp LOS                    | D                                                                                  | A    | C    |      |     |      | A    | D    | C    | E    | B    | A    |
| Approach Vol, veh/h          |                                                                                    | 590  |      |      |     |      |      | 1094 |      |      | 1388 |      |
| Approach Delay, s/veh        |                                                                                    | 50.3 |      |      |     |      |      | 39.9 |      |      | 25.6 |      |
| Approach LOS                 |                                                                                    | D    |      |      |     |      |      | D    |      |      | C    |      |
| Timer - Assigned Phs         | 1                                                                                  | 2    |      | 4    |     | 6    |      |      |      |      |      |      |
| Phs Duration (G+Y+Rc), s     | 28.6                                                                               | 29.4 |      | 31.5 |     | 58.0 |      |      |      |      |      |      |
| Change Period (Y+Rc), s      | 4.5                                                                                | 4.5  |      | 4.5  |     | 4.5  |      |      |      |      |      |      |
| Max Green Setting (Gmax), s  | 24.5                                                                               | 24.5 |      | 27.5 |     | 53.5 |      |      |      |      |      |      |
| Max Q Clear Time (g_c+I1), s | 24.0                                                                               | 23.0 |      | 26.8 |     | 15.2 |      |      |      |      |      |      |
| Green Ext Time (p_c), s      | 0.1                                                                                | 0.9  |      | 0.3  |     | 8.3  |      |      |      |      |      |      |
| <b>Intersection Summary</b>  |                                                                                    |      |      |      |     |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |                                                                                    |      | 35.4 |      |     |      |      |      |      |      |      |      |
| HCM 6th LOS                  |                                                                                    |      | D    |      |     |      |      |      |      |      |      |      |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

11/03/2020

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 31.8 |
| Intersection LOS          | D    |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 76                                                                                | 287                                                                               | 41   | 23                                                                                | 365                                                                               | 43   | 65   | 147                                                                                 | 28   | 95   | 83                                                                                  | 94   |
| Future Vol, veh/h   | 76                                                                                | 287                                                                               | 41   | 23                                                                                | 365                                                                               | 43   | 65   | 147                                                                                 | 28   | 95   | 83                                                                                  | 94   |
| Peak Hour Factor    | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96 | 0.96                                                                                | 0.96 | 0.96 | 0.96                                                                                | 0.96 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 79                                                                                | 299                                                                               | 43   | 24                                                                                | 380                                                                               | 45   | 68   | 153                                                                                 | 29   | 99   | 86                                                                                  | 98   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB | WB | NB   | SB   |
|----------------------------|----|----|------|------|
| Opposing Approach          | WB | EB | SB   | NB   |
| Opposing Lanes             | 2  | 2  | 1    | 1    |
| Conflicting Approach Left  | SB | NB | EB   | WB   |
| Conflicting Lanes Left     | 1  | 1  | 2    | 2    |
| Conflicting Approach Right | NB | SB | WB   | EB   |
| Conflicting Lanes Right    | 1  | 1  | 2    | 2    |
| HCM Control Delay          | 27 | 48 | 21.1 | 22.8 |
| HCM LOS                    | D  | E  | C    | C    |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 27%   | 100%  | 0%    | 100%  | 0%    | 35%   |
| Vol Thru, %            | 61%   | 0%    | 88%   | 0%    | 89%   | 31%   |
| Vol Right, %           | 12%   | 0%    | 12%   | 0%    | 11%   | 35%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 240   | 76    | 328   | 23    | 408   | 272   |
| LT Vol                 | 65    | 76    | 0     | 23    | 0     | 95    |
| Through Vol            | 147   | 0     | 287   | 0     | 365   | 83    |
| RT Vol                 | 28    | 0     | 41    | 0     | 43    | 94    |
| Lane Flow Rate         | 250   | 79    | 342   | 24    | 425   | 283   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.561 | 0.186 | 0.743 | 0.055 | 0.909 | 0.616 |
| Departure Headway (Hd) | 8.077 | 8.441 | 7.832 | 8.292 | 7.699 | 7.829 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 445   | 424   | 461   | 431   | 468   | 459   |
| Service Time           | 6.171 | 6.224 | 5.615 | 6.068 | 5.474 | 5.918 |
| HCM Lane V/C Ratio     | 0.562 | 0.186 | 0.742 | 0.056 | 0.908 | 0.617 |
| HCM Control Delay      | 21.1  | 13.2  | 30.2  | 11.6  | 50    | 22.8  |
| HCM Lane LOS           | C     | B     | D     | B     | E     | C     |
| HCM 95th-tile Q        | 3.4   | 0.7   | 6.1   | 0.2   | 10.2  | 4.1   |

# CUMULATIVE YEAR 2042 WORKSHEETS

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

11/02/2020

| Intersection             |        |      |        |      |             |      |        |      |      |      |      |      |
|--------------------------|--------|------|--------|------|-------------|------|--------|------|------|------|------|------|
| Int Delay, s/veh         | 2.7    |      |        |      |             |      |        |      |      |      |      |      |
| Movement                 | EBL    | EBT  | EBR    | WBL  | WBT         | WBR  | NBL    | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |        |      | ↗      |      |             | ↗    | ↑↑↑    | ↑↑↑  |      | ↗    | ↑↑↑  |      |
| Traffic Vol, veh/h       | 0      | 0    | 111    | 0    | 0           | 65   | 0      | 1829 | 74   | 62   | 1138 | 155  |
| Future Vol, veh/h        | 0      | 0    | 111    | 0    | 0           | 65   | 0      | 1829 | 74   | 62   | 1138 | 155  |
| Conflicting Peds, #/hr   | 0      | 0    | 0      | 0    | 0           | 0    | 0      | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop   | Stop | Stop   | Stop | Stop        | Stop | Free   | Free | Free | Free | Free | Free |
| RT Channelized           | -      | -    | None   | -    | -           | None | -      | -    | None | -    | -    | None |
| Storage Length           | -      | -    | 0      | -    | -           | 0    | -      | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -      | 0    | -      | -    | 0           | -    | -      | 0    | -    | -    | 0    | -    |
| Grade, %                 | -      | 0    | -      | -    | 0           | -    | -      | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92     | 92   | 92     | 92   | 92          | 92   | 92     | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3    | 3      | 3    | 3           | 3    | 3      | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0      | 0    | 121    | 0    | 0           | 71   | 0      | 1988 | 80   | 67   | 1237 | 168  |
|                          |        |      |        |      |             |      |        |      |      |      |      |      |
| Major/Minor              | Minor2 |      | Minor1 |      | Major1      |      | Major2 |      |      |      |      |      |
| Conflicting Flow All     | -      | -    | 703    | -    | -           | 1034 | -      | 0    | 0    | 2068 | 0    | 0    |
| Stage 1                  | -      | -    | -      | -    | -           | -    | -      | -    | -    | -    | -    | -    |
| Stage 2                  | -      | -    | -      | -    | -           | -    | -      | -    | -    | -    | -    | -    |
| Critical Hdwy            | -      | -    | 7.16   | -    | -           | 7.16 | -      | -    | -    | 5.36 | -    | -    |
| Critical Hdwy Stg 1      | -      | -    | -      | -    | -           | -    | -      | -    | -    | -    | -    | -    |
| Critical Hdwy Stg 2      | -      | -    | -      | -    | -           | -    | -      | -    | -    | -    | -    | -    |
| Follow-up Hdwy           | -      | -    | 3.93   | -    | -           | 3.93 | -      | -    | -    | 3.13 | -    | -    |
| Pot Cap-1 Maneuver       | 0      | 0    | 324    | 0    | 0           | 195  | 0      | -    | -    | 114  | -    | -    |
| Stage 1                  | 0      | 0    | -      | 0    | 0           | -    | 0      | -    | -    | -    | -    | -    |
| Stage 2                  | 0      | 0    | -      | 0    | 0           | -    | 0      | -    | -    | -    | -    | -    |
| Platoon blocked, %       |        |      |        |      |             |      |        | -    | -    |      | -    | -    |
| Mov Cap-1 Maneuver       | -      | -    | 324    | -    | -           | 195  | -      | -    | -    | 114  | -    | -    |
| Mov Cap-2 Maneuver       | -      | -    | -      | -    | -           | -    | -      | -    | -    | -    | -    | -    |
| Stage 1                  | -      | -    | -      | -    | -           | -    | -      | -    | -    | -    | -    | -    |
| Stage 2                  | -      | -    | -      | -    | -           | -    | -      | -    | -    | -    | -    | -    |
|                          |        |      |        |      |             |      |        |      |      |      |      |      |
|                          |        |      |        |      |             |      |        |      |      |      |      |      |
| Approach                 | EB     |      | WB     |      | NB          |      | SB     |      |      |      |      |      |
| HCM Control Delay, s     | 22.6   |      | 33.6   |      | 0           |      | 3.4    |      |      |      |      |      |
| HCM LOS                  | C      |      | D      |      |             |      |        |      |      |      |      |      |
|                          |        |      |        |      |             |      |        |      |      |      |      |      |
| Minor Lane/Major Mvmt    | NBT    |      | NBR    |      | EBLn1WBLn1  |      | SBL    | SBT  | SBR  |      |      |      |
| Capacity (veh/h)         | -      |      | -      |      | 324 195     |      | 114    | -    | -    |      |      |      |
| HCM Lane V/C Ratio       | -      |      | -      |      | 0.372 0.362 |      | 0.591  | -    | -    |      |      |      |
| HCM Control Delay (s)    | -      |      | -      |      | 22.6 33.6   |      | 74.4   | -    | -    |      |      |      |
| HCM Lane LOS             | -      |      | -      |      | C D         |      | F      | -    | -    |      |      |      |
| HCM 95th %tile Q(veh)    | -      |      | -      |      | 1.7 1.6     |      | 2.9    | -    | -    |      |      |      |



HCM 6th TWSC  
6: Campus Dr & 6th Street

11/02/2020

| Intersection             |        |       |        |             |       |        |       |      |        |       |      |      |
|--------------------------|--------|-------|--------|-------------|-------|--------|-------|------|--------|-------|------|------|
| Int Delay, s/veh         | 7.3    |       |        |             |       |        |       |      |        |       |      |      |
| Movement                 | EBL    | EBT   | EBR    | WBL         | WBT   | WBR    | NBL   | NBT  | NBR    | SBL   | SBT  | SBR  |
| Lane Configurations      |        | ↕     |        |             | ↕     |        |       | ↕    |        |       | ↕    |      |
| Traffic Vol, veh/h       | 25     | 20    | 2      | 0           | 15    | 113    | 2     | 6    | 2      | 46    | 8    | 39   |
| Future Vol, veh/h        | 25     | 20    | 2      | 0           | 15    | 113    | 2     | 6    | 2      | 46    | 8    | 39   |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0           | 0     | 0      | 0     | 0    | 0      | 0     | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop   | Stop        | Stop  | Stop   | Free  | Free | Free   | Free  | Free | Free |
| RT Channelized           | -      | -     | None   | -           | -     | None   | -     | -    | None   | -     | -    | None |
| Storage Length           | -      | -     | -      | -           | -     | -      | -     | -    | -      | -     | -    | -    |
| Veh in Median Storage, # | -      | 0     | -      | -           | 0     | -      | -     | 0    | -      | -     | 0    | -    |
| Grade, %                 | -      | 0     | -      | -           | 0     | -      | -     | 0    | -      | -     | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92     | 92          | 92    | 92     | 92    | 92   | 92     | 92    | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3      | 3           | 3     | 3      | 3     | 3    | 3      | 3     | 3    | 3    |
| Mvmt Flow                | 27     | 22    | 2      | 0           | 16    | 123    | 2     | 7    | 2      | 50    | 9    | 42   |
|                          |        |       |        |             |       |        |       |      |        |       |      |      |
| Major/Minor              | Minor2 |       | Minor1 |             |       | Major1 |       |      | Major2 |       |      |      |
| Conflicting Flow All     | 212    | 143   | 30     | 154         | 163   | 8      | 51    | 0    | 0      | 9     | 0    | 0    |
| Stage 1                  | 130    | 130   | -      | 12          | 12    | -      | -     | -    | -      | -     | -    | -    |
| Stage 2                  | 82     | 13    | -      | 142         | 151   | -      | -     | -    | -      | -     | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23   | 7.13        | 6.53  | 6.23   | 4.13  | -    | -      | 4.13  | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -      | 6.13        | 5.53  | -      | -     | -    | -      | -     | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -      | 6.13        | 5.53  | -      | -     | -    | -      | -     | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327  | 3.527       | 4.027 | 3.327  | 2.227 | -    | -      | 2.227 | -    | -    |
| Pot Cap-1 Maneuver       | 743    | 746   | 1042   | 811         | 728   | 1071   | 1549  | -    | -      | 1604  | -    | -    |
| Stage 1                  | 871    | 787   | -      | 1006        | 884   | -      | -     | -    | -      | -     | -    | -    |
| Stage 2                  | 924    | 883   | -      | 859         | 770   | -      | -     | -    | -      | -     | -    | -    |
| Platoon blocked, %       |        |       |        |             |       |        |       | -    | -      |       | -    | -    |
| Mov Cap-1 Maneuver       | 630    | 721   | 1042   | 771         | 704   | 1071   | 1549  | -    | -      | 1604  | -    | -    |
| Mov Cap-2 Maneuver       | 630    | 721   | -      | 771         | 704   | -      | -     | -    | -      | -     | -    | -    |
| Stage 1                  | 870    | 762   | -      | 1005        | 883   | -      | -     | -    | -      | -     | -    | -    |
| Stage 2                  | 802    | 882   | -      | 806         | 745   | -      | -     | -    | -      | -     | -    | -    |
|                          |        |       |        |             |       |        |       |      |        |       |      |      |
|                          |        |       |        |             |       |        |       |      |        |       |      |      |
| Approach                 | EB     |       | WB     |             |       | NB     |       |      | SB     |       |      |      |
| HCM Control Delay, s     | 10.7   |       | 9.1    |             |       | 1.5    |       |      | 3.6    |       |      |      |
| HCM LOS                  | B      |       | A      |             |       |        |       |      |        |       |      |      |
|                          |        |       |        |             |       |        |       |      |        |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR    | EBLn1WBLn1  | SBL   | SBT    | SBR   |      |        |       |      |      |
| Capacity (veh/h)         | 1549   | -     | -      | 678 1009    | 1604  | -      | -     |      |        |       |      |      |
| HCM Lane V/C Ratio       | 0.001  | -     | -      | 0.075 0.138 | 0.031 | -      | -     |      |        |       |      |      |
| HCM Control Delay (s)    | 7.3    | 0     | -      | 10.7 9.1    | 7.3   | 0      | -     |      |        |       |      |      |
| HCM Lane LOS             | A      | A     | -      | B A         | A     | A      | -     |      |        |       |      |      |
| HCM 95th %tile Q(veh)    | 0      | -     | -      | 0.2 0.5     | 0.1   | -      | -     |      |        |       |      |      |

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2.3  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↗    |      |      | ↗    | ↗    | ↗↘   |      | ↗    | ↗↘   |      |
| Traffic Vol, veh/h       | 0    | 0    | 80   | 0    | 0    | 80   | 153  | 1176 | 99   | 114  | 770  | 22   |
| Future Vol, veh/h        | 0    | 0    | 80   | 0    | 0    | 80   | 153  | 1176 | 99   | 114  | 770  | 22   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | 75   | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 87   | 0    | 0    | 87   | 166  | 1278 | 108  | 124  | 837  | 24   |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |   |
|----------------------|--------|---|--------|---|--------|------|--------|---|
| Conflicting Flow All | -      | - | 431    | - | -      | 693  | 861    | 0 |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy        | -      | - | 6.96   | - | -      | 6.96 | 4.16   | - |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | - |
| Follow-up Hdwy       | -      | - | 3.33   | - | -      | 3.33 | 2.23   | - |
| Pot Cap-1 Maneuver   | 0      | 0 | 570    | 0 | 0      | 384  | 770    | - |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | - |
| Mov Cap-1 Maneuver   | -      | - | 570    | - | -      | 384  | 770    | - |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | - |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |

| Approach             | EB   | WB   | NB  | SB  |
|----------------------|------|------|-----|-----|
| HCM Control Delay, s | 12.4 | 17.1 | 1.2 | 1.9 |
| HCM LOS              | B    | C    |     |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 770   | -   | -   | 570        | 384   | 485   | -   |
| HCM Lane V/C Ratio    | 0.216 | -   | -   | 0.153      | 0.226 | 0.255 | -   |
| HCM Control Delay (s) | 11    | -   | -   | 12.4       | 17.1  | 15    | -   |
| HCM Lane LOS          | B     | -   | -   | B          | C     | B     | -   |
| HCM 95th %tile Q(veh) | 0.8   | -   | -   | 0.5        | 0.9   | 1     | -   |

# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 71                                                                                | 719                                                                               | 79                                                                                | 1190                                                                              | 0                                                                                 | 0                                                                                 | 799                                                                                 | 444                                                                                 | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 71                                                                                | 719                                                                               | 79                                                                                | 1190                                                                              | 0                                                                                 | 0                                                                                 | 799                                                                                 | 444                                                                                 | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 77                                                                                | 782                                                                               | 86                                                                                | 1293                                                                              | 0                                                                                 | 0                                                                                 | 868                                                                                 | 483                                                                                 |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 525                                                                               | 935                                                                               | 111                                                                               | 2076                                                                              | 0                                                                                 | 0                                                                                 | 1654                                                                                | 738                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.30                                                                              | 0.30                                                                              | 0.06                                                                              | 0.59                                                                              | 0.00                                                                              | 0.00                                                                              | 0.47                                                                                | 0.47                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 77                                                                                | 782                                                                               | 86                                                                                | 1293                                                                              | 0                                                                                 | 0                                                                                 | 868                                                                                 | 483                                                                                 |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 2.5                                                                               | 18.4                                                                              | 3.8                                                                               | 18.8                                                                              | 0.0                                                                               | 0.0                                                                               | 13.7                                                                                | 18.6                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 2.5                                                                               | 18.4                                                                              | 3.8                                                                               | 18.8                                                                              | 0.0                                                                               | 0.0                                                                               | 13.7                                                                                | 18.6                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 525                                                                               | 935                                                                               | 111                                                                               | 2076                                                                              | 0                                                                                 | 0                                                                                 | 1654                                                                                | 738                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.15                                                                              | 0.84                                                                              | 0.78                                                                              | 0.62                                                                              | 0.00                                                                              | 0.00                                                                              | 0.52                                                                                | 0.65                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 772                                                                               | 1374                                                                              | 213                                                                               | 2076                                                                              | 0                                                                                 | 0                                                                                 | 1654                                                                                | 738                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 20.4                                                                              | 26.0                                                                              | 36.5                                                                              | 10.5                                                                              | 0.0                                                                               | 0.0                                                                               | 14.8                                                                                | 16.1                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 0.1                                                                               | 3.1                                                                               | 11.0                                                                              | 1.4                                                                               | 0.0                                                                               | 0.0                                                                               | 1.2                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 1.0                                                                               | 6.6                                                                               | 1.9                                                                               | 6.2                                                                               | 0.0                                                                               | 0.0                                                                               | 5.1                                                                                 | 6.7                                                                                 |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 20.5                                                                              | 29.0                                                                              | 47.4                                                                              | 12.0                                                                              | 0.0                                                                               | 0.0                                                                               | 16.0                                                                                | 20.6                                                                                |                                                                                     |                                                                                     |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | D                                                                                 | B                                                                                 | A                                                                                 | A                                                                                 | B                                                                                   | C                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 859                                                                               |                                                                                   |                                                                                   | 1379                                                                              |                                                                                   |                                                                                   | 1351                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 28.3                                                                              |                                                                                   |                                                                                   | 14.2                                                                              |                                                                                   |                                                                                   | 17.6                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 51.0                                                                              |                                                                                   | 9.5                                                                               |                                                                                   | 41.5                                                                              |                                                                                   | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 46.5                                                                              |                                                                                   | 9.5                                                                               |                                                                                   | 32.5                                                                              |                                                                                   | 34.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 20.8                                                                              |                                                                                   | 5.8                                                                               |                                                                                   | 20.6                                                                              |                                                                                   | 20.4                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 10.4                                                                              |                                                                                   | 0.0                                                                               |                                                                                   | 5.9                                                                               |                                                                                   | 3.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 18.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 3: 12th Avenue & SR 198 EB Off Ramps

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 594                                                                               | 0                                                                                 | 25                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 674                                                                                 | 189                                                                                 | 0                                                                                   | 501                                                                                 | 366                                                                                 |
| Future Volume (veh/h)        | 594                                                                               | 0                                                                                 | 25                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 674                                                                                 | 189                                                                                 | 0                                                                                   | 501                                                                                 | 366                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 646                                                                               | 0                                                                                 | 27                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 733                                                                                 | 0                                                                                   | 0                                                                                   | 545                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 820                                                                               | 0                                                                                 | 376                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2231                                                                                |                                                                                     | 0                                                                                   | 2231                                                                                |                                                                                     |
| Arrive On Green              | 0.24                                                                              | 0.00                                                                              | 0.24                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.63                                                                                | 0.00                                                                                | 0.00                                                                                | 0.63                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 646                                                                               | 0                                                                                 | 27                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 733                                                                                 | 0                                                                                   | 0                                                                                   | 545                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 12.4                                                                              | 0.0                                                                               | 0.9                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.7                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 12.4                                                                              | 0.0                                                                               | 0.9                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.7                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 820                                                                               | 0                                                                                 | 376                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2231                                                                                |                                                                                     | 0                                                                                   | 2231                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.79                                                                              | 0.00                                                                              | 0.07                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.33                                                                                |                                                                                     | 0.00                                                                                | 0.24                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1780                                                                              | 0                                                                                 | 816                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 2231                                                                                |                                                                                     | 0                                                                                   | 2231                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 25.1                                                                              | 0.0                                                                               | 20.7                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 5.6                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 1.7                                                                               | 0.0                                                                               | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.3                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 4.7                                                                               | 0.0                                                                               | 0.3                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 1.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 1.3                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 26.8                                                                              | 0.0                                                                               | 20.8                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 5.9                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 673                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 733                                                                                |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 26.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 6.4                                                                                |                                                                                     |                                                                                     | 5.9                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                  |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 49.0                                                                              |                                                                                   |                                                                                   | 21.3                                                                              |                                                                                   |                                                                                   | 49.0                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 44.5                                                                              |                                                                                   |                                                                                   | 36.5                                                                              |                                                                                   |                                                                                   | 44.5                                                                               |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 8.8                                                                               |                                                                                   |                                                                                   | 14.4                                                                              |                                                                                   |                                                                                   | 6.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 5.4                                                                               |                                                                                   |                                                                                   | 2.4                                                                               |                                                                                   |                                                                                   | 3.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 13.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 31                                                                                | 603                                                                               | 40                                                                                | 73                                                                                | 603                                                                               | 66                                                                                | 26                                                                                 | 73                                                                                  | 76                                                                                  | 68                                                                                  | 100                                                                                 | 19                                                                                  |
| Future Volume (veh/h)        | 31                                                                                | 603                                                                               | 40                                                                                | 73                                                                                | 603                                                                               | 66                                                                                | 26                                                                                 | 73                                                                                  | 76                                                                                  | 68                                                                                  | 100                                                                                 | 19                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 34                                                                                | 655                                                                               | 43                                                                                | 79                                                                                | 655                                                                               | 72                                                                                | 28                                                                                 | 79                                                                                  | 83                                                                                  | 74                                                                                  | 109                                                                                 | 21                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 60                                                                                | 863                                                                               | 385                                                                               | 102                                                                               | 946                                                                               | 422                                                                               | 52                                                                                 | 308                                                                                 | 323                                                                                 | 144                                                                                 | 785                                                                                 | 665                                                                                 |
| Arrive On Green              | 0.03                                                                              | 0.24                                                                              | 0.24                                                                              | 0.06                                                                              | 0.27                                                                              | 0.27                                                                              | 0.03                                                                               | 0.37                                                                                | 0.37                                                                                | 0.08                                                                                | 0.42                                                                                | 0.42                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                               | 828                                                                                 | 870                                                                                 | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 34                                                                                | 655                                                                               | 43                                                                                | 79                                                                                | 655                                                                               | 72                                                                                | 28                                                                                 | 0                                                                                   | 162                                                                                 | 74                                                                                  | 109                                                                                 | 21                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                               | 0                                                                                   | 1699                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.4                                                                               | 12.7                                                                              | 1.6                                                                               | 3.2                                                                               | 12.3                                                                              | 1.9                                                                               | 1.1                                                                                | 0.0                                                                                 | 4.9                                                                                 | 3.0                                                                                 | 2.6                                                                                 | 0.6                                                                                 |
| Cycle Q Clear(g_c), s        | 1.4                                                                               | 12.7                                                                              | 1.6                                                                               | 3.2                                                                               | 12.3                                                                              | 1.9                                                                               | 1.1                                                                                | 0.0                                                                                 | 4.9                                                                                 | 3.0                                                                                 | 2.6                                                                                 | 0.6                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 0.51                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 60                                                                                | 863                                                                               | 385                                                                               | 102                                                                               | 946                                                                               | 422                                                                               | 52                                                                                 | 0                                                                                   | 631                                                                                 | 144                                                                                 | 785                                                                                 | 665                                                                                 |
| V/C Ratio(X)                 | 0.57                                                                              | 0.76                                                                              | 0.11                                                                              | 0.78                                                                              | 0.69                                                                              | 0.17                                                                              | 0.53                                                                               | 0.00                                                                                | 0.26                                                                                | 0.51                                                                                | 0.14                                                                                | 0.03                                                                                |
| Avail Cap(c_a), veh/h        | 156                                                                               | 1223                                                                              | 546                                                                               | 233                                                                               | 1377                                                                              | 614                                                                               | 137                                                                                | 0                                                                                   | 631                                                                                 | 228                                                                                 | 785                                                                                 | 665                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 35.0                                                                              | 25.7                                                                              | 21.6                                                                              | 34.2                                                                              | 24.2                                                                              | 10.7                                                                              | 35.2                                                                               | 0.0                                                                                 | 16.1                                                                                | 32.4                                                                                | 13.0                                                                                | 12.4                                                                                |
| Incr Delay (d2), s/veh       | 8.1                                                                               | 1.8                                                                               | 0.1                                                                               | 11.8                                                                              | 0.9                                                                               | 0.2                                                                               | 8.2                                                                                | 0.0                                                                                 | 1.0                                                                                 | 2.8                                                                                 | 0.4                                                                                 | 0.1                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 5.2                                                                               | 0.6                                                                               | 1.7                                                                               | 4.9                                                                               | 0.9                                                                               | 0.6                                                                                | 0.0                                                                                 | 1.9                                                                                 | 1.3                                                                                 | 1.1                                                                                 | 0.2                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 43.0                                                                              | 27.5                                                                              | 21.7                                                                              | 46.0                                                                              | 25.1                                                                              | 10.9                                                                              | 43.4                                                                               | 0.0                                                                                 | 17.0                                                                                | 35.2                                                                                | 13.4                                                                                | 12.5                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                  | A                                                                                   | B                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 732                                                                               |                                                                                   |                                                                                   | 806                                                                               |                                                                                   |                                                                                   | 190                                                                                |                                                                                     |                                                                                     | 204                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 27.9                                                                              |                                                                                   |                                                                                   | 25.9                                                                              |                                                                                   |                                                                                   | 20.9                                                                               |                                                                                     |                                                                                     | 21.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.5                                                                              | 31.8                                                                              | 8.7                                                                               | 22.5                                                                              | 6.7                                                                               | 35.6                                                                              | 7.0                                                                                | 24.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.5                                                                               | 27.3                                                                              | 9.7                                                                               | 25.5                                                                              | 5.7                                                                               | 31.1                                                                              | 6.5                                                                                | 28.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 5.0                                                                               | 6.9                                                                               | 5.2                                                                               | 14.7                                                                              | 3.1                                                                               | 4.6                                                                               | 3.4                                                                                | 14.3                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.9                                                                               | 0.1                                                                               | 3.3                                                                               | 0.0                                                                               | 0.6                                                                               | 0.0                                                                                | 4.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 25.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 128                                                                               | 258                                                                               | 170                                                                               | 65                                                                                | 314                                                                               | 65                                                                                | 400                                                                                | 669                                                                                 | 77                                                                                  | 94                                                                                  | 725                                                                                 | 203                                                                                 |
| Future Volume (veh/h)        | 128                                                                               | 258                                                                               | 170                                                                               | 65                                                                                | 314                                                                               | 65                                                                                | 400                                                                                | 669                                                                                 | 77                                                                                  | 94                                                                                  | 725                                                                                 | 203                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 139                                                                               | 280                                                                               | 185                                                                               | 71                                                                                | 341                                                                               | 71                                                                                | 435                                                                                | 727                                                                                 | 84                                                                                  | 102                                                                                 | 788                                                                                 | 221                                                                                 |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 221                                                                               | 639                                                                               | 285                                                                               | 93                                                                                | 492                                                                               | 101                                                                               | 529                                                                                | 1416                                                                                | 164                                                                                 | 131                                                                                 | 1285                                                                                | 573                                                                                 |
| Arrive On Green              | 0.06                                                                              | 0.18                                                                              | 0.18                                                                              | 0.05                                                                              | 0.17                                                                              | 0.17                                                                              | 0.15                                                                               | 0.44                                                                                | 0.44                                                                                | 0.07                                                                                | 0.36                                                                                | 0.36                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2911                                                                              | 599                                                                               | 3428                                                                               | 3184                                                                                | 368                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 139                                                                               | 280                                                                               | 185                                                                               | 71                                                                                | 205                                                                               | 207                                                                               | 435                                                                                | 402                                                                                 | 409                                                                                 | 102                                                                                 | 788                                                                                 | 221                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1748                                                                              | 1714                                                                               | 1763                                                                                | 1789                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 2.9                                                                               | 5.1                                                                               | 5.2                                                                               | 2.9                                                                               | 7.9                                                                               | 8.1                                                                               | 8.9                                                                                | 11.9                                                                                | 12.0                                                                                | 4.1                                                                                 | 13.3                                                                                | 7.6                                                                                 |
| Cycle Q Clear(g_c), s        | 2.9                                                                               | 5.1                                                                               | 5.2                                                                               | 2.9                                                                               | 7.9                                                                               | 8.1                                                                               | 8.9                                                                                | 11.9                                                                                | 12.0                                                                                | 4.1                                                                                 | 13.3                                                                                | 7.6                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.34                                                                              | 1.00                                                                               |                                                                                     | 0.21                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 221                                                                               | 639                                                                               | 285                                                                               | 93                                                                                | 298                                                                               | 296                                                                               | 529                                                                                | 784                                                                                 | 796                                                                                 | 131                                                                                 | 1285                                                                                | 573                                                                                 |
| V/C Ratio(X)                 | 0.63                                                                              | 0.44                                                                              | 0.65                                                                              | 0.77                                                                              | 0.69                                                                              | 0.70                                                                              | 0.82                                                                               | 0.51                                                                                | 0.51                                                                                | 0.78                                                                                | 0.61                                                                                | 0.39                                                                                |
| Avail Cap(c_a), veh/h        | 236                                                                               | 1290                                                                              | 575                                                                               | 156                                                                               | 679                                                                               | 673                                                                               | 589                                                                                | 784                                                                                 | 796                                                                                 | 207                                                                                 | 1285                                                                                | 573                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 33.2                                                                              | 26.5                                                                              | 12.0                                                                              | 34.0                                                                              | 28.4                                                                              | 28.5                                                                              | 29.8                                                                               | 14.5                                                                                | 14.5                                                                                | 33.1                                                                                | 18.9                                                                                | 17.1                                                                                |
| Incr Delay (d2), s/veh       | 4.7                                                                               | 0.5                                                                               | 2.5                                                                               | 12.4                                                                              | 2.8                                                                               | 3.0                                                                               | 8.4                                                                                | 2.4                                                                                 | 2.4                                                                                 | 9.6                                                                                 | 2.2                                                                                 | 2.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.3                                                                               | 2.1                                                                               | 2.9                                                                               | 1.5                                                                               | 3.4                                                                               | 3.5                                                                               | 4.1                                                                                | 4.7                                                                                 | 4.8                                                                                 | 2.0                                                                                 | 5.3                                                                                 | 2.8                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 37.9                                                                              | 26.9                                                                              | 14.5                                                                              | 46.4                                                                              | 31.2                                                                              | 31.5                                                                              | 38.2                                                                               | 16.9                                                                                | 16.9                                                                                | 42.7                                                                                | 21.1                                                                                | 19.0                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 604                                                                               |                                                                                   |                                                                                   | 483                                                                               |                                                                                   |                                                                                   | 1246                                                                               |                                                                                     |                                                                                     | 1111                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 25.7                                                                              |                                                                                   |                                                                                   | 33.6                                                                              |                                                                                   |                                                                                   | 24.3                                                                               |                                                                                     |                                                                                     | 22.7                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 9.9                                                                               | 36.8                                                                              | 8.3                                                                               | 17.7                                                                              | 15.7                                                                              | 31.0                                                                              | 9.2                                                                                | 16.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.5                                                                               | 30.5                                                                              | 6.4                                                                               | 26.6                                                                              | 12.5                                                                              | 26.5                                                                              | 5.0                                                                                | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 6.1                                                                               | 14.0                                                                              | 4.9                                                                               | 7.2                                                                               | 10.9                                                                              | 15.3                                                                              | 4.9                                                                                | 10.1                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 4.6                                                                               | 0.0                                                                               | 2.2                                                                               | 0.3                                                                               | 4.6                                                                               | 0.0                                                                                | 2.2                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 25.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 8: 11th Avenue & 7th Street

11/02/2020

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|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 57                                                                                | 138                                                                               | 102                                                                               | 113                                                                               | 141                                                                               | 74                                                                                | 238                                                                                 | 668                                                                                 | 152                                                                                 | 110                                                                                 | 451                                                                                 | 99                                                                                  |
| Future Volume (veh/h)        | 57                                                                                | 138                                                                               | 102                                                                               | 113                                                                               | 141                                                                               | 74                                                                                | 238                                                                                 | 668                                                                                 | 152                                                                                 | 110                                                                                 | 451                                                                                 | 99                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 62                                                                                | 150                                                                               | 111                                                                               | 123                                                                               | 153                                                                               | 80                                                                                | 259                                                                                 | 726                                                                                 | 165                                                                                 | 120                                                                                 | 490                                                                                 | 108                                                                                 |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 171                                                                               | 247                                                                               | 171                                                                               | 155                                                                               | 370                                                                               | 184                                                                               | 303                                                                                 | 1571                                                                                | 701                                                                                 | 153                                                                                 | 1272                                                                                | 567                                                                                 |
| Arrive On Green              | 0.05                                                                              | 0.12                                                                              | 0.12                                                                              | 0.09                                                                              | 0.16                                                                              | 0.16                                                                              | 0.17                                                                                | 0.45                                                                                | 0.45                                                                                | 0.09                                                                                | 0.36                                                                                | 0.36                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1990                                                                              | 1380                                                                              | 1767                                                                              | 2280                                                                              | 1134                                                                              | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 62                                                                                | 132                                                                               | 129                                                                               | 123                                                                               | 116                                                                               | 117                                                                               | 259                                                                                 | 726                                                                                 | 165                                                                                 | 120                                                                                 | 490                                                                                 | 108                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1607                                                                              | 1767                                                                              | 1763                                                                              | 1651                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.2                                                                               | 5.0                                                                               | 5.4                                                                               | 4.8                                                                               | 4.2                                                                               | 4.5                                                                               | 10.0                                                                                | 10.1                                                                                | 2.8                                                                                 | 4.7                                                                                 | 7.3                                                                                 | 3.3                                                                                 |
| Cycle Q Clear(g_c), s        | 1.2                                                                               | 5.0                                                                               | 5.4                                                                               | 4.8                                                                               | 4.2                                                                               | 4.5                                                                               | 10.0                                                                                | 10.1                                                                                | 2.8                                                                                 | 4.7                                                                                 | 7.3                                                                                 | 3.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.86                                                                              | 1.00                                                                              |                                                                                   | 0.69                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 171                                                                               | 219                                                                               | 199                                                                               | 155                                                                               | 286                                                                               | 268                                                                               | 303                                                                                 | 1571                                                                                | 701                                                                                 | 153                                                                                 | 1272                                                                                | 567                                                                                 |
| V/C Ratio(X)                 | 0.36                                                                              | 0.60                                                                              | 0.65                                                                              | 0.79                                                                              | 0.41                                                                              | 0.44                                                                              | 0.85                                                                                | 0.46                                                                                | 0.24                                                                                | 0.78                                                                                | 0.39                                                                                | 0.19                                                                                |
| Avail Cap(c_a), veh/h        | 243                                                                               | 651                                                                               | 594                                                                               | 176                                                                               | 701                                                                               | 657                                                                               | 341                                                                                 | 1571                                                                                | 701                                                                                 | 233                                                                                 | 1272                                                                                | 567                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 32.4                                                                              | 29.2                                                                              | 29.4                                                                              | 31.5                                                                              | 26.5                                                                              | 26.6                                                                              | 28.3                                                                                | 13.6                                                                                | 4.5                                                                                 | 31.5                                                                                | 16.7                                                                                | 15.4                                                                                |
| Incr Delay (d2), s/veh       | 1.3                                                                               | 2.6                                                                               | 3.5                                                                               | 19.3                                                                              | 0.9                                                                               | 1.1                                                                               | 17.2                                                                                | 1.0                                                                                 | 0.8                                                                                 | 9.2                                                                                 | 0.9                                                                                 | 0.7                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.5                                                                               | 2.2                                                                               | 2.2                                                                               | 2.8                                                                               | 1.8                                                                               | 1.8                                                                               | 5.4                                                                                 | 3.8                                                                                 | 1.6                                                                                 | 2.3                                                                                 | 2.8                                                                                 | 1.3                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 33.6                                                                              | 31.8                                                                              | 32.9                                                                              | 50.7                                                                              | 27.4                                                                              | 27.7                                                                              | 45.5                                                                                | 14.6                                                                                | 5.3                                                                                 | 40.7                                                                                | 17.6                                                                                | 16.2                                                                                |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | B                                                                                   | A                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   | 323                                                                               |                                                                                   |                                                                                   | 356                                                                               |                                                                                   |                                                                                     | 1150                                                                                |                                                                                     |                                                                                     | 718                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   | 32.6                                                                              |                                                                                   |                                                                                   | 35.6                                                                              |                                                                                   |                                                                                     | 20.2                                                                                |                                                                                     |                                                                                     | 21.2                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.6                                                                              | 35.9                                                                              | 10.7                                                                              | 13.2                                                                              | 16.6                                                                              | 29.9                                                                              | 8.0                                                                                 | 15.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.3                                                                               | 29.7                                                                              | 7.0                                                                               | 26.0                                                                              | 13.6                                                                              | 25.4                                                                              | 5.0                                                                                 | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 6.7                                                                               | 12.1                                                                              | 6.8                                                                               | 7.4                                                                               | 12.0                                                                              | 9.3                                                                               | 3.2                                                                                 | 6.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 5.1                                                                               | 0.0                                                                               | 1.3                                                                               | 0.1                                                                               | 3.2                                                                               | 0.0                                                                                 | 1.4                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 24.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 32                                                                                | 0                                                                                 | 11                                                                                | 6                                                                                 | 0                                                                                 | 8                                                                                 | 40                                                                                  | 1387                                                                                | 36                                                                                  | 2                                                                                   | 778                                                                                 | 73                                                                                  |
| Future Volume (veh/h)        | 32                                                                                | 0                                                                                 | 11                                                                                | 6                                                                                 | 0                                                                                 | 8                                                                                 | 40                                                                                  | 1387                                                                                | 36                                                                                  | 2                                                                                   | 778                                                                                 | 73                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 35                                                                                | 0                                                                                 | 12                                                                                | 7                                                                                 | 0                                                                                 | 9                                                                                 | 43                                                                                  | 1508                                                                                | 39                                                                                  | 2                                                                                   | 846                                                                                 | 79                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 191                                                                               | 0                                                                                 | 83                                                                                | 110                                                                               | 8                                                                                 | 45                                                                                | 74                                                                                  | 2566                                                                                | 66                                                                                  | 5                                                                                   | 2438                                                                                | 1087                                                                                |
| Arrive On Green              | 0.05                                                                              | 0.00                                                                              | 0.05                                                                              | 0.05                                                                              | 0.00                                                                              | 0.05                                                                              | 0.04                                                                                | 0.73                                                                                | 0.73                                                                                | 0.00                                                                                | 0.69                                                                                | 0.69                                                                                |
| Sat Flow, veh/h              | 1395                                                                              | 0                                                                                 | 1572                                                                              | 523                                                                               | 145                                                                               | 859                                                                               | 1767                                                                                | 3511                                                                                | 91                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 35                                                                                | 0                                                                                 | 12                                                                                | 16                                                                                | 0                                                                                 | 0                                                                                 | 43                                                                                  | 756                                                                                 | 791                                                                                 | 2                                                                                   | 846                                                                                 | 79                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1395                                                                              | 0                                                                                 | 1572                                                                              | 1526                                                                              | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1839                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.8                                                                               | 0.0                                                                               | 0.5                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 1.5                                                                                 | 12.8                                                                                | 12.8                                                                                | 0.1                                                                                 | 6.2                                                                                 | 1.0                                                                                 |
| Cycle Q Clear(g_c), s        | 1.4                                                                               | 0.0                                                                               | 0.5                                                                               | 0.6                                                                               | 0.0                                                                               | 0.0                                                                               | 1.5                                                                                 | 12.8                                                                                | 12.8                                                                                | 0.1                                                                                 | 6.2                                                                                 | 1.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.44                                                                              |                                                                                   | 0.56                                                                              | 1.00                                                                                |                                                                                     | 0.05                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 191                                                                               | 0                                                                                 | 83                                                                                | 163                                                                               | 0                                                                                 | 0                                                                                 | 74                                                                                  | 1288                                                                                | 1344                                                                                | 5                                                                                   | 2438                                                                                | 1087                                                                                |
| V/C Ratio(X)                 | 0.18                                                                              | 0.00                                                                              | 0.14                                                                              | 0.10                                                                              | 0.00                                                                              | 0.00                                                                              | 0.58                                                                                | 0.59                                                                                | 0.59                                                                                | 0.41                                                                                | 0.35                                                                                | 0.07                                                                                |
| Avail Cap(c_a), veh/h        | 693                                                                               | 0                                                                                 | 649                                                                               | 698                                                                               | 0                                                                                 | 0                                                                                 | 187                                                                                 | 1288                                                                                | 1344                                                                                | 143                                                                                 | 2438                                                                                | 1087                                                                                |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 29.0                                                                              | 0.0                                                                               | 28.6                                                                              | 28.6                                                                              | 0.0                                                                               | 0.0                                                                               | 29.7                                                                                | 4.0                                                                                 | 4.0                                                                                 | 31.5                                                                                | 4.0                                                                                 | 3.2                                                                                 |
| Incr Delay (d2), s/veh       | 0.5                                                                               | 0.0                                                                               | 0.8                                                                               | 0.3                                                                               | 0.0                                                                               | 0.0                                                                               | 7.0                                                                                 | 2.0                                                                                 | 1.9                                                                                 | 48.3                                                                                | 0.4                                                                                 | 0.1                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.5                                                                               | 0.0                                                                               | 0.2                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 0.8                                                                                 | 3.2                                                                                 | 3.3                                                                                 | 0.1                                                                                 | 1.5                                                                                 | 0.2                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 29.4                                                                              | 0.0                                                                               | 29.3                                                                              | 28.9                                                                              | 0.0                                                                               | 0.0                                                                               | 36.7                                                                                | 6.0                                                                                 | 5.9                                                                                 | 79.7                                                                                | 4.3                                                                                 | 3.3                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | D                                                                                   | A                                                                                   | A                                                                                   | E                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 47                                                                                |                                                                                   |                                                                                   | 16                                                                                |                                                                                   |                                                                                   | 1590                                                                                |                                                                                     |                                                                                     | 927                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.4                                                                              |                                                                                   |                                                                                   | 28.9                                                                              |                                                                                   |                                                                                   | 6.8                                                                                 |                                                                                     |                                                                                     | 4.4                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 4.7                                                                               | 50.7                                                                              | 7.8                                                                               |                                                                                   | 7.1                                                                               | 48.2                                                                              | 7.8                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.1                                                                               | 45.3                                                                              | 26.1                                                                              |                                                                                   | 6.7                                                                               | 43.7                                                                              | 26.1                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 2.1                                                                               | 14.8                                                                              | 3.4                                                                               |                                                                                   | 3.5                                                                               | 8.2                                                                               | 2.6                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 14.6                                                                              | 0.1                                                                               |                                                                                   | 0.0                                                                               | 7.4                                                                               | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 6.5                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | A                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 11: 11th Avenue & SR 198 WB On Ramp/4th Street

11/02/2020

|                              |  |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
|------------------------------|------------------------------------------------------------------------------------|------|-----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                | EBT  | EBR | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                    |      |     |  |  |  |  |  |      |      |  |  |
| Traffic Volume (veh/h)       | 0                                                                                  | 0    | 0   | 182                                                                               | 25                                                                                | 337                                                                               | 80                                                                                  | 1138                                                                                | 0    | 0    | 589                                                                                 | 252                                                                                 |
| Future Volume (veh/h)        | 0                                                                                  | 0    | 0   | 182                                                                               | 25                                                                                | 337                                                                               | 80                                                                                  | 1138                                                                                | 0    | 0    | 589                                                                                 | 252                                                                                 |
| Initial Q (Qb), veh          |                                                                                    |      |     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0    | 0    | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00 | 1.00 |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                    |      |     | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |      |      | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                    |      |     | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0    | 0    | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                    |      |     | 198                                                                               | 27                                                                                | 366                                                                               | 87                                                                                  | 1237                                                                                | 0    | 0    | 640                                                                                 | 274                                                                                 |
| Peak Hour Factor             |                                                                                    |      |     | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92 | 0.92 | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         |                                                                                    |      |     | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0    | 0    | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                    |      |     | 475                                                                               | 499                                                                               | 422                                                                               | 113                                                                                 | 2175                                                                                | 0    | 0    | 1748                                                                                | 780                                                                                 |
| Arrive On Green              |                                                                                    |      |     | 0.27                                                                              | 0.27                                                                              | 0.27                                                                              | 0.06                                                                                | 0.62                                                                                | 0.00 | 0.00 | 0.50                                                                                | 0.50                                                                                |
| Sat Flow, veh/h              |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0    | 0    | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                    |      |     | 198                                                                               | 27                                                                                | 366                                                                               | 87                                                                                  | 1237                                                                                | 0    | 0    | 640                                                                                 | 274                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0    | 0    | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                    |      |     | 7.3                                                                               | 0.8                                                                               | 17.4                                                                              | 3.8                                                                                 | 16.3                                                                                | 0.0  | 0.0  | 8.8                                                                                 | 8.4                                                                                 |
| Cycle Q Clear(g_c), s        |                                                                                    |      |     | 7.3                                                                               | 0.8                                                                               | 17.4                                                                              | 3.8                                                                                 | 16.3                                                                                | 0.0  | 0.0  | 8.8                                                                                 | 8.4                                                                                 |
| Prop In Lane                 |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00 | 0.00 |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                    |      |     | 475                                                                               | 499                                                                               | 422                                                                               | 113                                                                                 | 2175                                                                                | 0    | 0    | 1748                                                                                | 780                                                                                 |
| V/C Ratio(X)                 |                                                                                    |      |     | 0.42                                                                              | 0.05                                                                              | 0.87                                                                              | 0.77                                                                                | 0.57                                                                                | 0.00 | 0.00 | 0.37                                                                                | 0.35                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                    |      |     | 730                                                                               | 767                                                                               | 650                                                                               | 258                                                                                 | 2175                                                                                | 0    | 0    | 1748                                                                                | 780                                                                                 |
| HCM Platoon Ratio            |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00 | 0.00 | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                    |      |     | 23.7                                                                              | 21.3                                                                              | 27.4                                                                              | 36.2                                                                                | 8.9                                                                                 | 0.0  | 0.0  | 12.2                                                                                | 12.1                                                                                |
| Incr Delay (d2), s/veh       |                                                                                    |      |     | 0.6                                                                               | 0.0                                                                               | 7.7                                                                               | 10.7                                                                                | 1.1                                                                                 | 0.0  | 0.0  | 0.6                                                                                 | 1.2                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                    |      |     | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0  | 0.0  | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                    |      |     | 2.8                                                                               | 0.3                                                                               | 6.8                                                                               | 1.9                                                                                 | 5.6                                                                                 | 0.0  | 0.0  | 3.2                                                                                 | 2.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                    |      |     | 24.3                                                                              | 21.4                                                                              | 35.1                                                                              | 46.9                                                                                | 10.0                                                                                | 0.0  | 0.0  | 12.8                                                                                | 13.3                                                                                |
| LnGrp LOS                    |                                                                                    |      |     | C                                                                                 | C                                                                                 | D                                                                                 | D                                                                                   | A                                                                                   | A    | A    | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                    |      |     |                                                                                   | 591                                                                               |                                                                                   |                                                                                     | 1324                                                                                |      |      | 914                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                    |      |     |                                                                                   | 30.9                                                                              |                                                                                   |                                                                                     | 12.4                                                                                |      |      | 13.0                                                                                |                                                                                     |
| Approach LOS                 |                                                                                    |      |     |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | B                                                                                   |      |      | B                                                                                   |                                                                                     |
| Timer - Assigned Phs         |                                                                                    | 2    |     |                                                                                   | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |      |      |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                    | 53.0 |     |                                                                                   | 9.5                                                                               | 43.5                                                                              |                                                                                     | 25.6                                                                                |      |      |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                    | 4.5  |     |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |      |      |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                    | 48.5 |     |                                                                                   | 11.5                                                                              | 32.5                                                                              |                                                                                     | 32.5                                                                                |      |      |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s |                                                                                    | 18.3 |     |                                                                                   | 5.8                                                                               | 10.8                                                                              |                                                                                     | 19.4                                                                                |      |      |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                    | 11.4 |     |                                                                                   | 0.1                                                                               | 5.3                                                                               |                                                                                     | 1.7                                                                                 |      |      |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                    |      |     | 16.4                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                    |      |     | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |                                                                                     |
| Traffic Volume (veh/h)       | 373                                                                               | 216                                                                               | 131                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 849                                                                                 | 207                                                                                 | 127                                                                                 | 649                                                                                 | 0                                                                                   |
| Future Volume (veh/h)        | 373                                                                               | 216                                                                               | 131                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 849                                                                                 | 207                                                                                 | 127                                                                                 | 649                                                                                 | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 405                                                                               | 235                                                                               | 142                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 923                                                                                 | 225                                                                                 | 138                                                                                 | 705                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 445                                                                               | 258                                                                               | 615                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1247                                                                                | 556                                                                                 | 171                                                                                 | 1775                                                                                | 0                                                                                   |
| Arrive On Green              | 0.39                                                                              | 0.39                                                                              | 0.39                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.35                                                                                | 0.35                                                                                | 0.10                                                                                | 0.50                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 1138                                                                              | 660                                                                               | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 640                                                                               | 0                                                                                 | 142                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 923                                                                                 | 225                                                                                 | 138                                                                                 | 705                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1799                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 28.7                                                                              | 0.0                                                                               | 5.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 19.5                                                                                | 9.2                                                                                 | 6.5                                                                                 | 10.6                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 28.7                                                                              | 0.0                                                                               | 5.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 19.5                                                                                | 9.2                                                                                 | 6.5                                                                                 | 10.6                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 0.63                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 703                                                                               | 0                                                                                 | 615                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1247                                                                                | 556                                                                                 | 171                                                                                 | 1775                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 0.91                                                                              | 0.00                                                                              | 0.23                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.74                                                                                | 0.40                                                                                | 0.81                                                                                | 0.40                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 804                                                                               | 0                                                                                 | 703                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1247                                                                                | 556                                                                                 | 212                                                                                 | 1775                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 24.5                                                                              | 0.0                                                                               | 17.4                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 24.1                                                                                | 20.8                                                                                | 37.7                                                                                | 13.1                                                                                | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 13.3                                                                              | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 4.0                                                                                 | 2.2                                                                                 | 16.8                                                                                | 0.7                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 13.3                                                                              | 0.0                                                                               | 1.7                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 8.1                                                                                 | 3.5                                                                                 | 3.6                                                                                 | 4.1                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 37.8                                                                              | 0.0                                                                               | 17.6                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 28.1                                                                                | 22.9                                                                                | 54.5                                                                                | 13.8                                                                                | 0.0                                                                                 |
| LnGrp LOS                    | D                                                                                 | A                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | C                                                                                   | C                                                                                   | D                                                                                   | B                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 782                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1148                                                                               |                                                                                     |                                                                                     | 843                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 34.1                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 27.1                                                                               |                                                                                     |                                                                                     | 20.5                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 12.7                                                                              | 34.7                                                                              | 37.8                                                                              |                                                                                   | 47.4                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 10.2                                                                              | 28.2                                                                              | 38.1                                                                              |                                                                                   | 42.9                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 8.5                                                                               | 21.5                                                                              | 30.7                                                                              |                                                                                   | 12.6                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 3.6                                                                               | 2.7                                                                               |                                                                                   | 5.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 27.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

11/02/2020

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 12.1 |
| Intersection LOS          | B    |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 127                                                                               | 181                                                                               | 25   | 28                                                                                | 223                                                                               | 48   | 34   | 87                                                                                  | 22   | 34   | 46                                                                                  | 51   |
| Future Vol, veh/h   | 127                                                                               | 181                                                                               | 25   | 28                                                                                | 223                                                                               | 48   | 34   | 87                                                                                  | 22   | 34   | 46                                                                                  | 51   |
| Peak Hour Factor    | 0.92                                                                              | 0.92                                                                              | 0.92 | 0.92                                                                              | 0.92                                                                              | 0.92 | 0.92 | 0.92                                                                                | 0.92 | 0.92 | 0.92                                                                                | 0.92 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 138                                                                               | 197                                                                               | 27   | 30                                                                                | 242                                                                               | 52   | 37   | 95                                                                                  | 24   | 37   | 50                                                                                  | 55   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 2    | 2    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 2    | 2    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 2    | 2    |
| HCM Control Delay          | 11.7 | 13.5 | 11.2 | 10.8 |
| HCM LOS                    | B    | B    | B    | B    |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 24%   | 100%  | 0%    | 100%  | 0%    | 26%   |
| Vol Thru, %            | 61%   | 0%    | 88%   | 0%    | 82%   | 35%   |
| Vol Right, %           | 15%   | 0%    | 12%   | 0%    | 18%   | 39%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 143   | 127   | 206   | 28    | 271   | 131   |
| LT Vol                 | 34    | 127   | 0     | 28    | 0     | 34    |
| Through Vol            | 87    | 0     | 181   | 0     | 223   | 46    |
| RT Vol                 | 22    | 0     | 25    | 0     | 48    | 51    |
| Lane Flow Rate         | 155   | 138   | 224   | 30    | 295   | 142   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.26  | 0.247 | 0.363 | 0.055 | 0.479 | 0.234 |
| Departure Headway (Hd) | 6.014 | 6.43  | 5.837 | 6.489 | 5.856 | 5.913 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 595   | 558   | 616   | 551   | 616   | 605   |
| Service Time           | 4.074 | 4.178 | 3.584 | 4.237 | 3.604 | 3.976 |
| HCM Lane V/C Ratio     | 0.261 | 0.247 | 0.364 | 0.054 | 0.479 | 0.235 |
| HCM Control Delay      | 11.2  | 11.3  | 11.9  | 9.6   | 13.9  | 10.8  |
| HCM Lane LOS           | B     | B     | B     | A     | B     | B     |
| HCM 95th-tile Q        | 1     | 1     | 1.7   | 0.2   | 2.6   | 0.9   |

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

11/02/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 66.6 |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↰    |      |      | ↰    |      | ↑↑↑  |      | ↰    | ↑↑↑  |      |
| Traffic Vol, veh/h       | 0    | 0    | 255  | 0    | 0    | 152  | 0    | 2631 | 45   | 56   | 2735 | 249  |
| Future Vol, veh/h        | 0    | 0    | 255  | 0    | 0    | 152  | 0    | 2631 | 45   | 56   | 2735 | 249  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | -    | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 277  | 0    | 0    | 165  | 0    | 2860 | 49   | 61   | 2973 | 271  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |       | Major2 |      |
|----------------------|--------|---|--------|---|--------|-------|--------|------|
| Conflicting Flow All | -      | - | 1622   | - | -      | 1455  | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -     | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -     | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16  | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -     | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -     | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93  | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | ~ 78   | 0 | 0      | ~ 101 | 0      | ~ 42 |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -     | 0      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -     | 0      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -     | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | ~ 78   | - | -      | ~ 101 | -      | ~ 42 |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -     | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -     | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -     | -      | -    |

| Approach              | EB     | WB    | NB | SB  |
|-----------------------|--------|-------|----|-----|
| HCM Control Delay, \$ | 1261.2 | 399.8 | 0  | 8.3 |
| HCM LOS               | F      | F     |    |     |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1     | WBLn1    | SBL      | SBT | SBR |
|-----------------------|-----|-----|-----------|----------|----------|-----|-----|
| Capacity (veh/h)      | -   | -   | 78        | 101      | ~ 42     | -   | -   |
| HCM Lane V/C Ratio    | -   | -   | 3.554     | 1.636    | 1.449    | -   | -   |
| HCM Control Delay (s) | -   | -   | \$ 1261.2 | \$ 399.8 | \$ 448.9 | -   | -   |
| HCM Lane LOS          | -   | -   | F         | F        | F        | -   | -   |
| HCM 95th %tile Q(veh) | -   | -   | 28.5      | 12.8     | 6.1      | -   | -   |

| Notes                      |                        |                            |                                |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |



HCM 6th TWSC  
6: Campus Dr & 6th Street

11/02/2020

| Intersection             |        |                                                                                   |        |             |                                                                                   |        |       |                                                                                   |        |       |                                                                                     |      |
|--------------------------|--------|-----------------------------------------------------------------------------------|--------|-------------|-----------------------------------------------------------------------------------|--------|-------|-----------------------------------------------------------------------------------|--------|-------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 7.8    |                                                                                   |        |             |                                                                                   |        |       |                                                                                   |        |       |                                                                                     |      |
| Movement                 | EBL    | EBT                                                                               | EBR    | WBL         | WBT                                                                               | WBR    | NBL   | NBT                                                                               | NBR    | SBL   | SBT                                                                                 | SBR  |
| Lane Configurations      |        |  |        |             |  |        |       |  |        |       |  |      |
| Traffic Vol, veh/h       | 19     | 12                                                                                | 0      | 0           | 6                                                                                 | 107    | 0     | 2                                                                                 | 0      | 94    | 2                                                                                   | 22   |
| Future Vol, veh/h        | 19     | 12                                                                                | 0      | 0           | 6                                                                                 | 107    | 0     | 2                                                                                 | 0      | 94    | 2                                                                                   | 22   |
| Conflicting Peds, #/hr   | 0      | 0                                                                                 | 0      | 0           | 0                                                                                 | 0      | 0     | 0                                                                                 | 0      | 0     | 0                                                                                   | 0    |
| Sign Control             | Stop   | Stop                                                                              | Stop   | Stop        | Stop                                                                              | Stop   | Free  | Free                                                                              | Free   | Free  | Free                                                                                | Free |
| RT Channelized           | -      | -                                                                                 | None   | -           | -                                                                                 | None   | -     | -                                                                                 | None   | -     | -                                                                                   | None |
| Storage Length           | -      | -                                                                                 | -      | -           | -                                                                                 | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Veh in Median Storage, # | -      | 0                                                                                 | -      | -           | 0                                                                                 | -      | -     | 0                                                                                 | -      | -     | 0                                                                                   | -    |
| Grade, %                 | -      | 0                                                                                 | -      | -           | 0                                                                                 | -      | -     | 0                                                                                 | -      | -     | 0                                                                                   | -    |
| Peak Hour Factor         | 92     | 92                                                                                | 92     | 92          | 92                                                                                | 92     | 92    | 92                                                                                | 92     | 92    | 92                                                                                  | 92   |
| Heavy Vehicles, %        | 3      | 3                                                                                 | 3      | 3           | 3                                                                                 | 3      | 3     | 3                                                                                 | 3      | 3     | 3                                                                                   | 3    |
| Mvmt Flow                | 21     | 13                                                                                | 0      | 0           | 7                                                                                 | 116    | 0     | 2                                                                                 | 0      | 102   | 2                                                                                   | 24   |
|                          |        |                                                                                   |        |             |                                                                                   |        |       |                                                                                   |        |       |                                                                                     |      |
| Major/Minor              | Minor2 |                                                                                   | Minor1 |             |                                                                                   | Major1 |       |                                                                                   | Major2 |       |                                                                                     |      |
| Conflicting Flow All     | 282    | 220                                                                               | 14     | 227         | 232                                                                               | 2      | 26    | 0                                                                                 | 0      | 2     | 0                                                                                   | 0    |
| Stage 1                  | 218    | 218                                                                               | -      | 2           | 2                                                                                 | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Stage 2                  | 64     | 2                                                                                 | -      | 225         | 230                                                                               | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Critical Hdwy            | 7.13   | 6.53                                                                              | 6.23   | 7.13        | 6.53                                                                              | 6.23   | 4.13  | -                                                                                 | -      | 4.13  | -                                                                                   | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53                                                                              | -      | 6.13        | 5.53                                                                              | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53                                                                              | -      | 6.13        | 5.53                                                                              | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Follow-up Hdwy           | 3.527  | 4.027                                                                             | 3.327  | 3.527       | 4.027                                                                             | 3.327  | 2.227 | -                                                                                 | -      | 2.227 | -                                                                                   | -    |
| Pot Cap-1 Maneuver       | 668    | 677                                                                               | 1063   | 726         | 666                                                                               | 1079   | 1582  | -                                                                                 | -      | 1614  | -                                                                                   | -    |
| Stage 1                  | 782    | 721                                                                               | -      | 1018        | 892                                                                               | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Stage 2                  | 944    | 892                                                                               | -      | 775         | 712                                                                               | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Platoon blocked, %       |        |                                                                                   |        |             |                                                                                   |        |       | -                                                                                 | -      |       | -                                                                                   | -    |
| Mov Cap-1 Maneuver       | 562    | 634                                                                               | 1063   | 680         | 623                                                                               | 1079   | 1582  | -                                                                                 | -      | 1614  | -                                                                                   | -    |
| Mov Cap-2 Maneuver       | 562    | 634                                                                               | -      | 680         | 623                                                                               | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Stage 1                  | 782    | 675                                                                               | -      | 1018        | 892                                                                               | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
| Stage 2                  | 836    | 892                                                                               | -      | 711         | 666                                                                               | -      | -     | -                                                                                 | -      | -     | -                                                                                   | -    |
|                          |        |                                                                                   |        |             |                                                                                   |        |       |                                                                                   |        |       |                                                                                     |      |
| Approach                 | EB     |                                                                                   | WB     |             |                                                                                   | NB     |       |                                                                                   | SB     |       |                                                                                     |      |
| HCM Control Delay, s     | 11.5   |                                                                                   | 8.9    |             |                                                                                   | 0      |       |                                                                                   | 5.9    |       |                                                                                     |      |
| HCM LOS                  | B      |                                                                                   | A      |             |                                                                                   |        |       |                                                                                   |        |       |                                                                                     |      |
|                          |        |                                                                                   |        |             |                                                                                   |        |       |                                                                                   |        |       |                                                                                     |      |
| Minor Lane/Major Mvmt    | NBL    | NBT                                                                               | NBR    | EBLn1WBLn1  | SBL                                                                               | SBT    | SBR   |                                                                                   |        |       |                                                                                     |      |
| Capacity (veh/h)         | 1582   | -                                                                                 | -      | 588 1039    | 1614                                                                              | -      | -     |                                                                                   |        |       |                                                                                     |      |
| HCM Lane V/C Ratio       | -      | -                                                                                 | -      | 0.057 0.118 | 0.063                                                                             | -      | -     |                                                                                   |        |       |                                                                                     |      |
| HCM Control Delay (s)    | 0      | -                                                                                 | -      | 11.5 8.9    | 7.4                                                                               | 0      | -     |                                                                                   |        |       |                                                                                     |      |
| HCM Lane LOS             | A      | -                                                                                 | -      | B A         | A                                                                                 | A      | -     |                                                                                   |        |       |                                                                                     |      |
| HCM 95th %tile Q(veh)    | 0      | -                                                                                 | -      | 0.2 0.4     | 0.2                                                                               | -      | -     |                                                                                   |        |       |                                                                                     |      |

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 7    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↗    |      |      | ↗    | ↗    | ↗    |      | ↗    | ↗    |      |
| Traffic Vol, veh/h       | 0    | 0    | 105  | 0    | 0    | 249  | 152  | 1580 | 162  | 165  | 1679 | 12   |
| Future Vol, veh/h        | 0    | 0    | 105  | 0    | 0    | 249  | 152  | 1580 | 162  | 165  | 1679 | 12   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | 75   | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 108  | 0    | 0    | 257  | 157  | 1629 | 167  | 170  | 1731 | 12   |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |   |
|----------------------|--------|---|--------|---|--------|------|--------|---|
| Conflicting Flow All | -      | - | 872    | - | -      | 898  | 1743   | 0 |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy        | -      | - | 6.96   | - | -      | 6.96 | 4.16   | - |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | - |
| Follow-up Hdwy       | -      | - | 3.33   | - | -      | 3.33 | 2.23   | - |
| Pot Cap-1 Maneuver   | 0      | 0 | 292    | 0 | 0      | 280  | 352    | - |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | - |
| Mov Cap-1 Maneuver   | -      | - | 292    | - | -      | 280  | 352    | - |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | - |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |

| Approach             | EB   | WB   | NB  | SB  |
|----------------------|------|------|-----|-----|
| HCM Control Delay, s | 24.4 | 74.3 | 1.9 | 2.3 |
| HCM LOS              | C    | F    |     |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | 352   | -   | -   | 292        | 280   | 336   | -   |
| HCM Lane V/C Ratio    | 0.445 | -   | -   | 0.371      | 0.917 | 0.506 | -   |
| HCM Control Delay (s) | 23.2  | -   | -   | 24.4       | 74.3  | 26.2  | -   |
| HCM Lane LOS          | C     | -   | -   | C          | F     | D     | -   |
| HCM 95th %tile Q(veh) | 2.2   | -   | -   | 1.6        | 8.5   | 2.7   | -   |

# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 221                                                                               | 835                                                                               | 71                                                                                | 1847                                                                              | 0                                                                                 | 0                                                                                 | 1983                                                                                | 1016                                                                                | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 221                                                                               | 835                                                                               | 71                                                                                | 1847                                                                              | 0                                                                                 | 0                                                                                 | 1983                                                                                | 1016                                                                                | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 240                                                                               | 908                                                                               | 77                                                                                | 2008                                                                              | 0                                                                                 | 0                                                                                 | 2155                                                                                | 1104                                                                                |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 434                                                                               | 773                                                                               | 81                                                                                | 2394                                                                              | 0                                                                                 | 0                                                                                 | 2101                                                                                | 937                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.25                                                                              | 0.25                                                                              | 0.05                                                                              | 0.68                                                                              | 0.00                                                                              | 0.00                                                                              | 0.60                                                                                | 0.60                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 240                                                                               | 908                                                                               | 77                                                                                | 2008                                                                              | 0                                                                                 | 0                                                                                 | 2155                                                                                | 1104                                                                                |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 14.2                                                                              | 29.5                                                                              | 5.2                                                                               | 50.9                                                                              | 0.0                                                                               | 0.0                                                                               | 71.5                                                                                | 71.5                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 14.2                                                                              | 29.5                                                                              | 5.2                                                                               | 50.9                                                                              | 0.0                                                                               | 0.0                                                                               | 71.5                                                                                | 71.5                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 434                                                                               | 773                                                                               | 81                                                                                | 2394                                                                              | 0                                                                                 | 0                                                                                 | 2101                                                                                | 937                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.55                                                                              | 1.17                                                                              | 0.95                                                                              | 0.84                                                                              | 0.00                                                                              | 0.00                                                                              | 1.03                                                                                | 1.18                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 434                                                                               | 773                                                                               | 81                                                                                | 2394                                                                              | 0                                                                                 | 0                                                                                 | 2101                                                                                | 937                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 39.5                                                                              | 45.3                                                                              | 57.1                                                                              | 14.3                                                                              | 0.0                                                                               | 0.0                                                                               | 24.2                                                                                | 24.2                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 1.5                                                                               | 91.9                                                                              | 83.2                                                                              | 3.7                                                                               | 0.0                                                                               | 0.0                                                                               | 26.5                                                                                | 91.4                                                                                |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 6.2                                                                               | 20.9                                                                              | 4.2                                                                               | 18.4                                                                              | 0.0                                                                               | 0.0                                                                               | 34.1                                                                                | 47.3                                                                                |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 41.0                                                                              | 137.1                                                                             | 140.3                                                                             | 18.1                                                                              | 0.0                                                                               | 0.0                                                                               | 50.8                                                                                | 115.6                                                                               |                                                                                     |                                                                                     |
| LnGrp LOS                    | D                                                                                 | F                                                                                 | F                                                                                 | B                                                                                 | A                                                                                 | A                                                                                 | F                                                                                   | F                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 1148                                                                              |                                                                                   |                                                                                   | 2085                                                                              |                                                                                   |                                                                                   | 3259                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 117.0                                                                             |                                                                                   |                                                                                   | 22.6                                                                              |                                                                                   |                                                                                   | 72.8                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | F                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 86.0                                                                              |                                                                                   | 10.0                                                                              |                                                                                   | 76.0                                                                              |                                                                                   | 34.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 81.5                                                                              |                                                                                   | 5.5                                                                               |                                                                                   | 71.5                                                                              |                                                                                   | 29.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 52.9                                                                              |                                                                                   | 7.2                                                                               |                                                                                   | 73.5                                                                              |                                                                                   | 31.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 19.4                                                                              |                                                                                   | 0.0                                                                               |                                                                                   | 0.0                                                                               |                                                                                   | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 64.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 3: 12th Avenue & SR 198 EB Off Ramps

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                     |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 883                                                                               | 0                                                                                 | 76                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 1020                                                                                | 221                                                                                 | 0                                                                                   | 1362                                                                                | 856                                                                                 |
| Future Volume (veh/h)        | 883                                                                               | 0                                                                                 | 76                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 1020                                                                                | 221                                                                                 | 0                                                                                   | 1362                                                                                | 856                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 949                                                                               | 0                                                                                 | 82                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1097                                                                                | 0                                                                                   | 0                                                                                   | 1465                                                                                | 0                                                                                   |
| Peak Hour Factor             | 0.93                                                                              | 0.93                                                                              | 0.93                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 1089                                                                              | 0                                                                                 | 499                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2029                                                                                |                                                                                     | 0                                                                                   | 2029                                                                                |                                                                                     |
| Arrive On Green              | 0.32                                                                              | 0.00                                                                              | 0.32                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.58                                                                                | 0.00                                                                                | 0.00                                                                                | 0.58                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 949                                                                               | 0                                                                                 | 82                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1097                                                                                | 0                                                                                   | 0                                                                                   | 1465                                                                                | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 22.0                                                                              | 0.0                                                                               | 3.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 16.2                                                                                | 0.0                                                                                 | 0.0                                                                                 | 25.4                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 22.0                                                                              | 0.0                                                                               | 3.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 16.2                                                                                | 0.0                                                                                 | 0.0                                                                                 | 25.4                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 1089                                                                              | 0                                                                                 | 499                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2029                                                                                |                                                                                     | 0                                                                                   | 2029                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.87                                                                              | 0.00                                                                              | 0.16                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.54                                                                                |                                                                                     | 0.00                                                                                | 0.72                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1322                                                                              | 0                                                                                 | 607                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2029                                                                                |                                                                                     | 0                                                                                   | 2029                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 27.1                                                                              | 0.0                                                                               | 20.7                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 11.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 13.0                                                                                | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 5.7                                                                               | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 1.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.3                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 9.0                                                                               | 0.0                                                                               | 1.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 5.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 8.9                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 32.8                                                                              | 0.0                                                                               | 20.9                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 12.1                                                                                | 0.0                                                                                 | 0.0                                                                                 | 15.2                                                                                | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                   | B                                                                                   |                                                                                     | A                                                                                   | B                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 1031                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1097                                                                                |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 31.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 12.1                                                                                |                                                                                     |                                                                                     | 15.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 53.0                                                                              |                                                                                   |                                                                                   | 31.3                                                                              |                                                                                   |                                                                                   | 53.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 48.5                                                                              |                                                                                   |                                                                                   | 32.5                                                                              |                                                                                   |                                                                                   | 48.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 18.2                                                                              |                                                                                   |                                                                                   | 24.0                                                                              |                                                                                   |                                                                                   | 27.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 8.8                                                                               |                                                                                   |                                                                                   | 2.8                                                                               |                                                                                   |                                                                                   | 11.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 19.0                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 46                                                                                | 1144                                                                              | 51                                                                                | 80                                                                                | 1268                                                                              | 66                                                                                | 56                                                                                  | 105                                                                                 | 182                                                                                 | 155                                                                                 | 133                                                                                 | 53                                                                                  |
| Future Volume (veh/h)        | 46                                                                                | 1144                                                                              | 51                                                                                | 80                                                                                | 1268                                                                              | 66                                                                                | 56                                                                                  | 105                                                                                 | 182                                                                                 | 155                                                                                 | 133                                                                                 | 53                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 50                                                                                | 1243                                                                              | 55                                                                                | 87                                                                                | 1378                                                                              | 72                                                                                | 61                                                                                  | 114                                                                                 | 198                                                                                 | 168                                                                                 | 145                                                                                 | 58                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 70                                                                                | 1277                                                                              | 570                                                                               | 102                                                                               | 1341                                                                              | 598                                                                               | 78                                                                                  | 172                                                                                 | 298                                                                                 | 173                                                                                 | 623                                                                                 | 528                                                                                 |
| Arrive On Green              | 0.04                                                                              | 0.36                                                                              | 0.36                                                                              | 0.06                                                                              | 0.38                                                                              | 0.38                                                                              | 0.04                                                                                | 0.28                                                                                | 0.28                                                                                | 0.10                                                                                | 0.34                                                                                | 0.34                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                                | 608                                                                                 | 1057                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 50                                                                                | 1243                                                                              | 55                                                                                | 87                                                                                | 1378                                                                              | 72                                                                                | 61                                                                                  | 0                                                                                   | 312                                                                                 | 168                                                                                 | 145                                                                                 | 58                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                                | 0                                                                                   | 1665                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 2.5                                                                               | 31.3                                                                              | 2.1                                                                               | 4.4                                                                               | 34.2                                                                              | 1.8                                                                               | 3.1                                                                                 | 0.0                                                                                 | 14.9                                                                                | 8.5                                                                                 | 5.1                                                                                 | 2.3                                                                                 |
| Cycle Q Clear(g_c), s        | 2.5                                                                               | 31.3                                                                              | 2.1                                                                               | 4.4                                                                               | 34.2                                                                              | 1.8                                                                               | 3.1                                                                                 | 0.0                                                                                 | 14.9                                                                                | 8.5                                                                                 | 5.1                                                                                 | 2.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.63                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 70                                                                                | 1277                                                                              | 570                                                                               | 102                                                                               | 1341                                                                              | 598                                                                               | 78                                                                                  | 0                                                                                   | 470                                                                                 | 173                                                                                 | 623                                                                                 | 528                                                                                 |
| V/C Ratio(X)                 | 0.71                                                                              | 0.97                                                                              | 0.10                                                                              | 0.85                                                                              | 1.03                                                                              | 0.12                                                                              | 0.78                                                                                | 0.00                                                                                | 0.66                                                                                | 0.97                                                                                | 0.23                                                                                | 0.11                                                                                |
| Avail Cap(c_a), veh/h        | 98                                                                                | 1277                                                                              | 570                                                                               | 102                                                                               | 1341                                                                              | 598                                                                               | 173                                                                                 | 0                                                                                   | 470                                                                                 | 173                                                                                 | 623                                                                                 | 528                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 42.7                                                                              | 28.3                                                                              | 19.0                                                                              | 42.0                                                                              | 27.9                                                                              | 8.4                                                                               | 42.6                                                                                | 0.0                                                                                 | 28.5                                                                                | 40.5                                                                                | 21.5                                                                                | 20.6                                                                                |
| Incr Delay (d2), s/veh       | 13.4                                                                              | 19.1                                                                              | 0.1                                                                               | 46.1                                                                              | 31.9                                                                              | 0.1                                                                               | 15.1                                                                                | 0.0                                                                                 | 7.2                                                                                 | 60.1                                                                                | 0.9                                                                                 | 0.4                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.3                                                                               | 15.7                                                                              | 0.7                                                                               | 3.2                                                                               | 19.3                                                                              | 0.9                                                                               | 1.7                                                                                 | 0.0                                                                                 | 6.7                                                                                 | 6.5                                                                                 | 2.3                                                                                 | 0.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 56.1                                                                              | 47.3                                                                              | 19.0                                                                              | 88.1                                                                              | 59.8                                                                              | 8.5                                                                               | 57.6                                                                                | 0.0                                                                                 | 35.7                                                                                | 100.6                                                                               | 22.4                                                                                | 21.0                                                                                |
| LnGrp LOS                    | E                                                                                 | D                                                                                 | B                                                                                 | F                                                                                 | F                                                                                 | A                                                                                 | E                                                                                   | A                                                                                   | D                                                                                   | F                                                                                   | C                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 1348                                                                              |                                                                                   |                                                                                   | 1537                                                                              |                                                                                   |                                                                                   | 373                                                                                 |                                                                                     |                                                                                     | 371                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 46.5                                                                              |                                                                                   |                                                                                   | 59.0                                                                              |                                                                                   |                                                                                   | 39.3                                                                                |                                                                                     |                                                                                     | 57.6                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   | D                                                                                   |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 13.3                                                                              | 29.9                                                                              | 9.7                                                                               | 37.1                                                                              | 8.5                                                                               | 34.7                                                                              | 8.1                                                                                 | 38.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.8                                                                               | 25.4                                                                              | 5.2                                                                               | 32.6                                                                              | 8.8                                                                               | 25.4                                                                              | 5.0                                                                                 | 32.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 10.5                                                                              | 16.9                                                                              | 6.4                                                                               | 33.3                                                                              | 5.1                                                                               | 7.1                                                                               | 4.5                                                                                 | 36.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 1.2                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.9                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 52.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 391                                                                               | 414                                                                               | 329                                                                               | 170                                                                               | 470                                                                               | 131                                                                               | 473                                                                                | 977                                                                                 | 88                                                                                  | 142                                                                                 | 853                                                                                 | 162                                                                                 |
| Future Volume (veh/h)        | 391                                                                               | 414                                                                               | 329                                                                               | 170                                                                               | 470                                                                               | 131                                                                               | 473                                                                                | 977                                                                                 | 88                                                                                  | 142                                                                                 | 853                                                                                 | 162                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 425                                                                               | 450                                                                               | 358                                                                               | 185                                                                               | 511                                                                               | 142                                                                               | 514                                                                                | 1062                                                                                | 96                                                                                  | 154                                                                                 | 927                                                                                 | 176                                                                                 |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 466                                                                               | 838                                                                               | 374                                                                               | 218                                                                               | 614                                                                               | 170                                                                               | 569                                                                                | 1159                                                                                | 105                                                                                 | 183                                                                                 | 1029                                                                                | 459                                                                                 |
| Arrive On Green              | 0.14                                                                              | 0.24                                                                              | 0.24                                                                              | 0.12                                                                              | 0.22                                                                              | 0.22                                                                              | 0.17                                                                               | 0.35                                                                                | 0.35                                                                                | 0.10                                                                                | 0.29                                                                                | 0.29                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2728                                                                              | 754                                                                               | 3428                                                                               | 3270                                                                                | 295                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 425                                                                               | 450                                                                               | 358                                                                               | 185                                                                               | 329                                                                               | 324                                                                               | 514                                                                                | 572                                                                                 | 586                                                                                 | 154                                                                                 | 927                                                                                 | 176                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1720                                                                              | 1714                                                                               | 1763                                                                                | 1802                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 12.1                                                                              | 11.1                                                                              | 14.8                                                                              | 10.2                                                                              | 17.7                                                                              | 17.9                                                                              | 14.6                                                                               | 30.8                                                                                | 30.9                                                                                | 8.5                                                                                 | 25.1                                                                                | 8.9                                                                                 |
| Cycle Q Clear(g_c), s        | 12.1                                                                              | 11.1                                                                              | 14.8                                                                              | 10.2                                                                              | 17.7                                                                              | 17.9                                                                              | 14.6                                                                               | 30.8                                                                                | 30.9                                                                                | 8.5                                                                                 | 25.1                                                                                | 8.9                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.44                                                                              | 1.00                                                                               |                                                                                     | 0.16                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 466                                                                               | 838                                                                               | 374                                                                               | 218                                                                               | 396                                                                               | 387                                                                               | 569                                                                                | 625                                                                                 | 639                                                                                 | 183                                                                                 | 1029                                                                                | 459                                                                                 |
| V/C Ratio(X)                 | 0.91                                                                              | 0.54                                                                              | 0.96                                                                              | 0.85                                                                              | 0.83                                                                              | 0.84                                                                              | 0.90                                                                               | 0.92                                                                                | 0.92                                                                                | 0.84                                                                                | 0.90                                                                                | 0.38                                                                                |
| Avail Cap(c_a), veh/h        | 466                                                                               | 948                                                                               | 423                                                                               | 263                                                                               | 497                                                                               | 485                                                                               | 569                                                                                | 625                                                                                 | 639                                                                                 | 183                                                                                 | 1029                                                                                | 459                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 42.3                                                                              | 33.1                                                                              | 16.4                                                                              | 42.7                                                                              | 36.7                                                                              | 36.8                                                                              | 40.6                                                                               | 30.7                                                                                | 30.7                                                                                | 43.7                                                                                | 33.8                                                                                | 28.0                                                                                |
| Incr Delay (d2), s/veh       | 22.2                                                                              | 0.5                                                                               | 31.4                                                                              | 19.5                                                                              | 9.3                                                                               | 10.1                                                                              | 17.7                                                                               | 20.4                                                                                | 20.2                                                                                | 27.9                                                                                | 12.4                                                                                | 2.4                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 6.5                                                                               | 4.7                                                                               | 8.3                                                                               | 5.5                                                                               | 8.4                                                                               | 8.4                                                                               | 7.4                                                                                | 16.0                                                                                | 16.4                                                                                | 5.1                                                                                 | 12.1                                                                                | 3.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 64.5                                                                              | 33.6                                                                              | 47.8                                                                              | 62.1                                                                              | 46.0                                                                              | 46.8                                                                              | 58.3                                                                               | 51.1                                                                                | 50.9                                                                                | 71.6                                                                                | 46.2                                                                                | 30.5                                                                                |
| LnGrp LOS                    | E                                                                                 | C                                                                                 | D                                                                                 | E                                                                                 | D                                                                                 | D                                                                                 | E                                                                                  | D                                                                                   | D                                                                                   | E                                                                                   | D                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 1233                                                                              |                                                                                   |                                                                                   | 838                                                                               |                                                                                   |                                                                                   | 1672                                                                               |                                                                                     |                                                                                     | 1257                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 48.4                                                                              |                                                                                   |                                                                                   | 49.9                                                                              |                                                                                   |                                                                                   | 53.2                                                                               |                                                                                     |                                                                                     | 47.1                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                  |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 14.8                                                                              | 39.7                                                                              | 16.7                                                                              | 28.1                                                                              | 21.0                                                                              | 33.5                                                                              | 18.0                                                                               | 26.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 10.3                                                                              | 35.2                                                                              | 14.8                                                                              | 26.7                                                                              | 16.5                                                                              | 29.0                                                                              | 13.5                                                                               | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 10.5                                                                              | 32.9                                                                              | 12.2                                                                              | 16.8                                                                              | 16.6                                                                              | 27.1                                                                              | 14.1                                                                               | 19.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 1.5                                                                               | 0.1                                                                               | 3.0                                                                               | 0.0                                                                               | 1.2                                                                               | 0.0                                                                                | 2.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 49.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 8: 11th Avenue & 7th Street

11/02/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 104                                                                               | 272                                                                               | 339                                                                               | 252                                                                               | 250                                                                               | 169                                                                               | 258                                                                                 | 901                                                                                 | 178                                                                                 | 172                                                                                 | 853                                                                                 | 80                                                                                  |
| Future Volume (veh/h)        | 104                                                                               | 272                                                                               | 339                                                                               | 252                                                                               | 250                                                                               | 169                                                                               | 258                                                                                 | 901                                                                                 | 178                                                                                 | 172                                                                                 | 853                                                                                 | 80                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 113                                                                               | 296                                                                               | 368                                                                               | 274                                                                               | 272                                                                               | 184                                                                               | 280                                                                                 | 979                                                                                 | 193                                                                                 | 187                                                                                 | 927                                                                                 | 87                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 169                                                                               | 417                                                                               | 372                                                                               | 281                                                                               | 706                                                                               | 463                                                                               | 284                                                                                 | 1147                                                                                | 512                                                                                 | 204                                                                                 | 987                                                                                 | 440                                                                                 |
| Arrive On Green              | 0.05                                                                              | 0.24                                                                              | 0.24                                                                              | 0.16                                                                              | 0.35                                                                              | 0.35                                                                              | 0.16                                                                                | 0.33                                                                                | 0.33                                                                                | 0.12                                                                                | 0.28                                                                                | 0.28                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 2041                                                                              | 1337                                                                              | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 113                                                                               | 296                                                                               | 368                                                                               | 274                                                                               | 234                                                                               | 222                                                                               | 280                                                                                 | 979                                                                                 | 193                                                                                 | 187                                                                                 | 927                                                                                 | 87                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1615                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 3.6                                                                               | 17.0                                                                              | 25.7                                                                              | 17.0                                                                              | 11.0                                                                              | 11.5                                                                              | 17.4                                                                                | 28.5                                                                                | 6.7                                                                                 | 11.5                                                                                | 28.3                                                                                | 4.6                                                                                 |
| Cycle Q Clear(g_c), s        | 3.6                                                                               | 17.0                                                                              | 25.7                                                                              | 17.0                                                                              | 11.0                                                                              | 11.5                                                                              | 17.4                                                                                | 28.5                                                                                | 6.7                                                                                 | 11.5                                                                                | 28.3                                                                                | 4.6                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.83                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 169                                                                               | 417                                                                               | 372                                                                               | 281                                                                               | 610                                                                               | 559                                                                               | 284                                                                                 | 1147                                                                                | 512                                                                                 | 204                                                                                 | 987                                                                                 | 440                                                                                 |
| V/C Ratio(X)                 | 0.67                                                                              | 0.71                                                                              | 0.99                                                                              | 0.97                                                                              | 0.38                                                                              | 0.40                                                                              | 0.98                                                                                | 0.85                                                                                | 0.38                                                                                | 0.92                                                                                | 0.94                                                                                | 0.20                                                                                |
| Avail Cap(c_a), veh/h        | 234                                                                               | 417                                                                               | 372                                                                               | 281                                                                               | 610                                                                               | 559                                                                               | 284                                                                                 | 1147                                                                                | 512                                                                                 | 204                                                                                 | 987                                                                                 | 440                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 51.4                                                                              | 38.5                                                                              | 41.9                                                                              | 46.0                                                                              | 27.1                                                                              | 27.3                                                                              | 46.0                                                                                | 34.6                                                                                | 11.8                                                                                | 48.1                                                                                | 38.7                                                                                | 30.2                                                                                |
| Incr Delay (d2), s/veh       | 4.5                                                                               | 5.6                                                                               | 43.9                                                                              | 46.5                                                                              | 0.4                                                                               | 0.5                                                                               | 49.0                                                                                | 8.1                                                                                 | 2.1                                                                                 | 40.5                                                                                | 17.3                                                                                | 1.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.6                                                                               | 7.8                                                                               | 14.2                                                                              | 11.1                                                                              | 4.7                                                                               | 4.5                                                                               | 11.4                                                                                | 13.2                                                                                | 2.6                                                                                 | 7.3                                                                                 | 14.2                                                                                | 1.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 55.9                                                                              | 44.1                                                                              | 85.8                                                                              | 92.5                                                                              | 27.5                                                                              | 27.7                                                                              | 95.0                                                                                | 42.8                                                                                | 13.9                                                                                | 88.6                                                                                | 55.9                                                                                | 31.2                                                                                |
| LnGrp LOS                    | E                                                                                 | D                                                                                 | F                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 | F                                                                                   | D                                                                                   | B                                                                                   | F                                                                                   | E                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 777                                                                               |                                                                                   |                                                                                   | 730                                                                               |                                                                                   |                                                                                   | 1452                                                                                |                                                                                     |                                                                                     | 1201                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 65.6                                                                              |                                                                                   |                                                                                   | 52.0                                                                              |                                                                                   |                                                                                   | 49.0                                                                                |                                                                                     |                                                                                     | 59.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                   |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 17.2                                                                              | 40.3                                                                              | 22.0                                                                              | 30.5                                                                              | 22.2                                                                              | 35.3                                                                              | 9.9                                                                                 | 42.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 12.7                                                                              | 35.8                                                                              | 17.5                                                                              | 26.0                                                                              | 17.7                                                                              | 30.8                                                                              | 7.5                                                                                 | 36.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 13.5                                                                              | 30.5                                                                              | 19.0                                                                              | 27.7                                                                              | 19.4                                                                              | 30.3                                                                              | 5.6                                                                                 | 13.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.1                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.4                                                                               | 0.1                                                                                 | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 55.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

11/02/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 213                                                                               | 0                                                                                 | 66                                                                                | 15                                                                                | 0                                                                                 | 15                                                                                | 249                                                                                 | 1656                                                                                | 5                                                                                   | 12                                                                                  | 1566                                                                                | 189                                                                                 |
| Future Volume (veh/h)        | 213                                                                               | 0                                                                                 | 66                                                                                | 15                                                                                | 0                                                                                 | 15                                                                                | 249                                                                                 | 1656                                                                                | 5                                                                                   | 12                                                                                  | 1566                                                                                | 189                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 220                                                                               | 0                                                                                 | 68                                                                                | 15                                                                                | 0                                                                                 | 15                                                                                | 257                                                                                 | 1707                                                                                | 5                                                                                   | 12                                                                                  | 1614                                                                                | 195                                                                                 |
| Peak Hour Factor             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 337                                                                               | 0                                                                                 | 274                                                                               | 159                                                                               | 19                                                                                | 117                                                                               | 291                                                                                 | 2380                                                                                | 7                                                                                   | 25                                                                                  | 1798                                                                                | 802                                                                                 |
| Arrive On Green              | 0.17                                                                              | 0.00                                                                              | 0.17                                                                              | 0.17                                                                              | 0.00                                                                              | 0.17                                                                              | 0.16                                                                                | 0.66                                                                                | 0.66                                                                                | 0.01                                                                                | 0.51                                                                                | 0.51                                                                                |
| Sat Flow, veh/h              | 1387                                                                              | 0                                                                                 | 1572                                                                              | 565                                                                               | 109                                                                               | 673                                                                               | 1767                                                                                | 3606                                                                                | 11                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 220                                                                               | 0                                                                                 | 68                                                                                | 30                                                                                | 0                                                                                 | 0                                                                                 | 257                                                                                 | 834                                                                                 | 878                                                                                 | 12                                                                                  | 1614                                                                                | 195                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1387                                                                              | 0                                                                                 | 1572                                                                              | 1347                                                                              | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1854                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 9.5                                                                               | 0.0                                                                               | 3.3                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 12.7                                                                                | 27.3                                                                                | 27.3                                                                                | 0.6                                                                                 | 37.0                                                                                | 6.2                                                                                 |
| Cycle Q Clear(g_c), s        | 12.8                                                                              | 0.0                                                                               | 3.3                                                                               | 3.4                                                                               | 0.0                                                                               | 0.0                                                                               | 12.7                                                                                | 27.3                                                                                | 27.3                                                                                | 0.6                                                                                 | 37.0                                                                                | 6.2                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.50                                                                              |                                                                                   | 0.50                                                                              | 1.00                                                                                |                                                                                     | 0.01                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 337                                                                               | 0                                                                                 | 274                                                                               | 295                                                                               | 0                                                                                 | 0                                                                                 | 291                                                                                 | 1164                                                                                | 1224                                                                                | 25                                                                                  | 1798                                                                                | 802                                                                                 |
| V/C Ratio(X)                 | 0.65                                                                              | 0.00                                                                              | 0.25                                                                              | 0.10                                                                              | 0.00                                                                              | 0.00                                                                              | 0.88                                                                                | 0.72                                                                                | 0.72                                                                                | 0.47                                                                                | 0.90                                                                                | 0.24                                                                                |
| Avail Cap(c_a), veh/h        | 498                                                                               | 0                                                                                 | 457                                                                               | 463                                                                               | 0                                                                                 | 0                                                                                 | 295                                                                                 | 1164                                                                                | 1224                                                                                | 99                                                                                  | 1798                                                                                | 802                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 35.4                                                                              | 0.0                                                                               | 31.8                                                                              | 31.0                                                                              | 0.0                                                                               | 0.0                                                                               | 36.5                                                                                | 9.8                                                                                 | 9.8                                                                                 | 43.7                                                                                | 19.8                                                                                | 12.2                                                                                |
| Incr Delay (d2), s/veh       | 2.1                                                                               | 0.0                                                                               | 0.5                                                                               | 0.1                                                                               | 0.0                                                                               | 0.0                                                                               | 25.4                                                                                | 3.8                                                                                 | 3.6                                                                                 | 12.9                                                                                | 7.5                                                                                 | 0.7                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 4.7                                                                               | 0.0                                                                               | 1.3                                                                               | 0.6                                                                               | 0.0                                                                               | 0.0                                                                               | 7.4                                                                                 | 10.0                                                                                | 10.5                                                                                | 0.4                                                                                 | 15.7                                                                                | 2.2                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 37.6                                                                              | 0.0                                                                               | 32.3                                                                              | 31.2                                                                              | 0.0                                                                               | 0.0                                                                               | 61.9                                                                                | 13.6                                                                                | 13.4                                                                                | 56.6                                                                                | 27.3                                                                                | 13.0                                                                                |
| LnGrp LOS                    | D                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | E                                                                                   | B                                                                                   | B                                                                                   | E                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 288                                                                               |                                                                                   |                                                                                   | 30                                                                                |                                                                                   |                                                                                   | 1969                                                                                |                                                                                     |                                                                                     | 1821                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 36.3                                                                              |                                                                                   |                                                                                   | 31.2                                                                              |                                                                                   |                                                                                   | 19.8                                                                                |                                                                                     |                                                                                     | 26.0                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 5.8                                                                               | 63.5                                                                              | 20.1                                                                              |                                                                                   | 19.2                                                                              | 50.1                                                                              | 20.1                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.0                                                                               | 55.5                                                                              | 26.0                                                                              |                                                                                   | 14.9                                                                              | 45.6                                                                              | 26.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 2.6                                                                               | 29.3                                                                              | 14.8                                                                              |                                                                                   | 14.7                                                                              | 39.0                                                                              | 5.4                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 15.5                                                                              | 0.8                                                                               |                                                                                   | 0.0                                                                               | 5.4                                                                               | 0.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 23.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

11/02/2020

|                              |  |      |     |      |      |      |      |      |      |      |      |      |
|------------------------------|------------------------------------------------------------------------------------|------|-----|------|------|------|------|------|------|------|------|------|
| Movement                     | EBL                                                                                | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations          |                                                                                    |      |     | ↰    | ↱    | ↰    | ↰    | ↱    |      |      | ↱    | ↰    |
| Traffic Volume (veh/h)       | 0                                                                                  | 0    | 0   | 337  | 54   | 303  | 141  | 1595 | 0    | 0    | 1351 | 428  |
| Future Volume (veh/h)        | 0                                                                                  | 0    | 0   | 337  | 54   | 303  | 141  | 1595 | 0    | 0    | 1351 | 428  |
| Initial Q (Qb), veh          |                                                                                    |      |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          |                                                                                    |      |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |                                                                                    |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach        |                                                                                    |      |     | No   |      |      | No   |      |      |      | No   |      |
| Adj Sat Flow, veh/h/ln       |                                                                                    |      |     | 1856 | 1856 | 1856 | 1856 | 1856 | 0    | 0    | 1856 | 1856 |
| Adj Flow Rate, veh/h         |                                                                                    |      |     | 355  | 57   | 319  | 148  | 1679 | 0    | 0    | 1422 | 451  |
| Peak Hour Factor             |                                                                                    |      |     | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, %         |                                                                                    |      |     | 3    | 3    | 3    | 3    | 3    | 0    | 0    | 3    | 3    |
| Cap, veh/h                   |                                                                                    |      |     | 431  | 453  | 384  | 182  | 2265 | 0    | 0    | 1702 | 759  |
| Arrive On Green              |                                                                                    |      |     | 0.24 | 0.24 | 0.24 | 0.10 | 0.64 | 0.00 | 0.00 | 0.48 | 0.48 |
| Sat Flow, veh/h              |                                                                                    |      |     | 1767 | 1856 | 1572 | 1767 | 3618 | 0    | 0    | 3618 | 1572 |
| Grp Volume(v), veh/h         |                                                                                    |      |     | 355  | 57   | 319  | 148  | 1679 | 0    | 0    | 1422 | 451  |
| Grp Sat Flow(s),veh/h/ln     |                                                                                    |      |     | 1767 | 1856 | 1572 | 1767 | 1763 | 0    | 0    | 1763 | 1572 |
| Q Serve(g_s), s              |                                                                                    |      |     | 15.1 | 1.9  | 15.3 | 6.5  | 25.8 | 0.0  | 0.0  | 27.7 | 16.5 |
| Cycle Q Clear(g_c), s        |                                                                                    |      |     | 15.1 | 1.9  | 15.3 | 6.5  | 25.8 | 0.0  | 0.0  | 27.7 | 16.5 |
| Prop In Lane                 |                                                                                    |      |     | 1.00 |      | 1.00 | 1.00 |      | 0.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |                                                                                    |      |     | 431  | 453  | 384  | 182  | 2265 | 0    | 0    | 1702 | 759  |
| V/C Ratio(X)                 |                                                                                    |      |     | 0.82 | 0.13 | 0.83 | 0.81 | 0.74 | 0.00 | 0.00 | 0.84 | 0.59 |
| Avail Cap(c_a), veh/h        |                                                                                    |      |     | 668  | 701  | 594  | 191  | 2265 | 0    | 0    | 1702 | 759  |
| HCM Platoon Ratio            |                                                                                    |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           |                                                                                    |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh     |                                                                                    |      |     | 28.4 | 23.4 | 28.5 | 34.8 | 9.7  | 0.0  | 0.0  | 17.8 | 14.9 |
| Incr Delay (d2), s/veh       |                                                                                    |      |     | 4.9  | 0.1  | 5.9  | 21.9 | 2.2  | 0.0  | 0.0  | 5.0  | 3.4  |
| Initial Q Delay(d3),s/veh    |                                                                                    |      |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |                                                                                    |      |     | 6.4  | 0.8  | 5.9  | 3.8  | 8.7  | 0.0  | 0.0  | 11.1 | 6.0  |
| Unsig. Movement Delay, s/veh |                                                                                    |      |     |      |      |      |      |      |      |      |      |      |
| LnGrp Delay(d),s/veh         |                                                                                    |      |     | 33.2 | 23.5 | 34.3 | 56.7 | 11.9 | 0.0  | 0.0  | 22.8 | 18.3 |
| LnGrp LOS                    |                                                                                    |      |     | C    | C    | C    | E    | B    | A    | A    | C    | B    |
| Approach Vol, veh/h          |                                                                                    |      |     |      | 731  |      |      | 1827 |      |      | 1873 |      |
| Approach Delay, s/veh        |                                                                                    |      |     |      | 33.0 |      |      | 15.5 |      |      | 21.7 |      |
| Approach LOS                 |                                                                                    |      |     |      | C    |      |      | B    |      |      | C    |      |
| Timer - Assigned Phs         |                                                                                    | 2    |     |      | 5    | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |                                                                                    | 55.5 |     |      | 12.7 | 42.8 |      | 23.9 |      |      |      |      |
| Change Period (Y+Rc), s      |                                                                                    | 4.5  |     |      | 4.5  | 4.5  |      | 4.5  |      |      |      |      |
| Max Green Setting (Gmax), s  |                                                                                    | 51.0 |     |      | 8.6  | 37.9 |      | 30.0 |      |      |      |      |
| Max Q Clear Time (g_c+l1), s |                                                                                    | 27.8 |     |      | 8.5  | 29.7 |      | 17.3 |      |      |      |      |
| Green Ext Time (p_c), s      |                                                                                    | 14.6 |     |      | 0.0  | 6.2  |      | 2.1  |      |      |      |      |
| <b>Intersection Summary</b>  |                                                                                    |      |     |      |      |      |      |      |      |      |      |      |
| HCM 6th Ctrl Delay           |                                                                                    |      |     | 21.0 |      |      |      |      |      |      |      |      |
| HCM 6th LOS                  |                                                                                    |      |     | C    |      |      |      |      |      |      |      |      |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |                                                                                     |
| Traffic Volume (veh/h)       | 570                                                                               | 122                                                                               | 116                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 1167                                                                                | 314                                                                                 | 436                                                                                 | 1260                                                                                | 0                                                                                   |
| Future Volume (veh/h)        | 570                                                                               | 122                                                                               | 116                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 1167                                                                                | 314                                                                                 | 436                                                                                 | 1260                                                                                | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 594                                                                               | 127                                                                               | 121                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1216                                                                                | 327                                                                                 | 454                                                                                 | 1312                                                                                | 0                                                                                   |
| Peak Hour Factor             | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.96                                                                               | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 514                                                                               | 110                                                                               | 550                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1106                                                                                | 493                                                                                 | 378                                                                                 | 2003                                                                                | 0                                                                                   |
| Arrive On Green              | 0.35                                                                              | 0.35                                                                              | 0.35                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.31                                                                                | 0.31                                                                                | 0.21                                                                                | 0.57                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 1468                                                                              | 314                                                                               | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 721                                                                               | 0                                                                                 | 121                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1216                                                                                | 327                                                                                 | 454                                                                                 | 1312                                                                                | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1782                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 38.5                                                                              | 0.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 34.5                                                                                | 19.8                                                                                | 23.5                                                                                | 28.2                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 38.5                                                                              | 0.0                                                                               | 6.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 34.5                                                                                | 19.8                                                                                | 23.5                                                                                | 28.2                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 0.82                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 624                                                                               | 0                                                                                 | 550                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1106                                                                                | 493                                                                                 | 378                                                                                 | 2003                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 1.16                                                                              | 0.00                                                                              | 0.22                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.10                                                                                | 0.66                                                                                | 1.20                                                                                | 0.65                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 624                                                                               | 0                                                                                 | 550                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1106                                                                                | 493                                                                                 | 378                                                                                 | 2003                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 35.8                                                                              | 0.0                                                                               | 25.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 37.8                                                                                | 32.7                                                                                | 43.3                                                                                | 16.3                                                                                | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 87.3                                                                              | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 58.6                                                                                | 6.9                                                                                 | 113.8                                                                               | 1.7                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 30.8                                                                              | 0.0                                                                               | 2.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 23.2                                                                                | 8.2                                                                                 | 22.1                                                                                | 11.2                                                                                | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 123.1                                                                             | 0.0                                                                               | 25.4                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 96.4                                                                                | 39.6                                                                                | 157.1                                                                               | 18.0                                                                                | 0.0                                                                                 |
| LnGrp LOS                    | F                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | F                                                                                   | D                                                                                   | F                                                                                   | B                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 842                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1543                                                                               |                                                                                     |                                                                                     | 1766                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 109.1                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 84.3                                                                               |                                                                                     |                                                                                     | 53.8                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | F                                                                                  |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 28.0                                                                              | 39.0                                                                              | 43.0                                                                              |                                                                                   | 67.0                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 23.5                                                                              | 34.5                                                                              | 38.5                                                                              |                                                                                   | 62.5                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 25.5                                                                              | 36.5                                                                              | 40.5                                                                              |                                                                                   | 30.2                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   | 12.7                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 76.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

11/02/2020

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 92.9 |
| Intersection LOS          | F    |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 108                                                                               | 410                                                                               | 40   | 14                                                                                | 521                                                                               | 62   | 59   | 73                                                                                  | 6    | 136  | 45                                                                                  | 135  |
| Future Vol, veh/h   | 108                                                                               | 410                                                                               | 40   | 14                                                                                | 521                                                                               | 62   | 59   | 73                                                                                  | 6    | 136  | 45                                                                                  | 135  |
| Peak Hour Factor    | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96 | 0.96                                                                                | 0.96 | 0.96 | 0.96                                                                                | 0.96 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 113                                                                               | 427                                                                               | 42   | 15                                                                                | 543                                                                               | 65   | 61   | 76                                                                                  | 6    | 142  | 47                                                                                  | 141  |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB    | NB   | SB   |
|----------------------------|------|-------|------|------|
| Opposing Approach          | WB   | EB    | SB   | NB   |
| Opposing Lanes             | 2    | 2     | 1    | 1    |
| Conflicting Approach Left  | SB   | NB    | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1     | 2    | 2    |
| Conflicting Approach Right | NB   | SB    | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1     | 2    | 2    |
| HCM Control Delay          | 58.9 | 175.5 | 18.1 | 29.5 |
| HCM LOS                    | F    | F     | C    | D    |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 43%   | 100%  | 0%    | 100%  | 0%    | 43%   |
| Vol Thru, %            | 53%   | 0%    | 91%   | 0%    | 89%   | 14%   |
| Vol Right, %           | 4%    | 0%    | 9%    | 0%    | 11%   | 43%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 138   | 108   | 450   | 14    | 583   | 316   |
| LT Vol                 | 59    | 108   | 0     | 14    | 0     | 136   |
| Through Vol            | 73    | 0     | 410   | 0     | 521   | 45    |
| RT Vol                 | 6     | 0     | 40    | 0     | 62    | 135   |
| Lane Flow Rate         | 144   | 112   | 469   | 15    | 607   | 329   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.354 | 0.256 | 0.991 | 0.034 | 1.314 | 0.708 |
| Departure Headway (Hd) | 9.816 | 8.804 | 8.219 | 8.387 | 7.792 | 8.475 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 369   | 411   | 445   | 426   | 468   | 431   |
| Service Time           | 7.816 | 6.504 | 5.919 | 6.148 | 5.553 | 6.475 |
| HCM Lane V/C Ratio     | 0.39  | 0.273 | 1.054 | 0.035 | 1.297 | 0.763 |
| HCM Control Delay      | 18.1  | 14.5  | 69.5  | 11.4  | 179.4 | 29.5  |
| HCM Lane LOS           | C     | B     | F     | B     | F     | D     |
| HCM 95th-tile Q        | 1.6   | 1     | 12.5  | 0.1   | 26.5  | 5.4   |

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

11/02/2020

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 6.4  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↰    |      |      | ↰    |      | ↑↑↑  |      | ↰    | ↑↑↑  |      |
| Traffic Vol, veh/h       | 0    | 0    | 111  | 0    | 0    | 118  | 0    | 1829 | 191  | 85   | 1182 | 155  |
| Future Vol, veh/h        | 0    | 0    | 111  | 0    | 0    | 118  | 0    | 1829 | 191  | 85   | 1182 | 155  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | -    | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 121  | 0    | 0    | 128  | 0    | 1988 | 208  | 92   | 1285 | 168  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |      |
|----------------------|--------|---|--------|---|--------|------|--------|------|
| Conflicting Flow All | -      | - | 727    | - | -      | 1098 | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16 | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93 | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | 313    | 0 | 0      | 177  | 0      | 98   |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | 313    | - | -      | 177  | -      | 98   |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |

| Approach             | EB   | WB   | NB | SB  |
|----------------------|------|------|----|-----|
| HCM Control Delay, s | 23.5 | 65.7 | 0  | 9.2 |
| HCM LOS              | C    | F    |    |     |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1 | SBL   | SBT   | SBR |
|-----------------------|-----|-----|------------|-------|-------|-----|
| Capacity (veh/h)      | -   | -   | 313        | 177   | 98    | -   |
| HCM Lane V/C Ratio    | -   | -   | 0.385      | 0.725 | 0.943 | -   |
| HCM Control Delay (s) | -   | -   | 23.5       | 65.7  | 154.4 | -   |
| HCM Lane LOS          | -   | -   | C          | F     | F     | -   |
| HCM 95th %tile Q(veh) | -   | -   | 1.8        | 4.5   | 5.5   | -   |



HCM 6th TWSC  
6: Campus Dr & 6th Street

11/02/2020

| Intersection             |        |       |        |            |        |       |        |      |      |       |      |      |
|--------------------------|--------|-------|--------|------------|--------|-------|--------|------|------|-------|------|------|
| Int Delay, s/veh         | 4.7    |       |        |            |        |       |        |      |      |       |      |      |
| Movement                 | EBL    | EBT   | EBR    | WBL        | WBT    | WBR   | NBL    | NBT  | NBR  | SBL   | SBT  | SBR  |
| Lane Configurations      |        | ↔     |        |            | ↔      |       |        | ↔    |      |       | ↔    |      |
| Traffic Vol, veh/h       | 25     | 20    | 2      | 0          | 15     | 113   | 2      | 59   | 2    | 46    | 148  | 39   |
| Future Vol, veh/h        | 25     | 20    | 2      | 0          | 15     | 113   | 2      | 59   | 2    | 46    | 148  | 39   |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0          | 0      | 0     | 0      | 0    | 0    | 0     | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop   | Stop       | Stop   | Stop  | Free   | Free | Free | Free  | Free | Free |
| RT Channelized           | -      | -     | None   | -          | -      | None  | -      | -    | None | -     | -    | None |
| Storage Length           | -      | -     | -      | -          | -      | -     | -      | -    | -    | -     | -    | -    |
| Veh in Median Storage, # | -      | 0     | -      | -          | 0      | -     | -      | 0    | -    | -     | 0    | -    |
| Grade, %                 | -      | 0     | -      | -          | 0      | -     | -      | 0    | -    | -     | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92     | 92         | 92     | 92    | 92     | 92   | 92   | 92    | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3      | 3          | 3      | 3     | 3      | 3    | 3    | 3     | 3    | 3    |
| Mvmt Flow                | 27     | 22    | 2      | 0          | 16     | 123   | 2      | 64   | 2    | 50    | 161  | 42   |
| Major/Minor              | Minor2 |       | Minor1 |            | Major1 |       | Major2 |      |      |       |      |      |
| Conflicting Flow All     | 421    | 352   | 182    | 363        | 372    | 65    | 203    | 0    | 0    | 66    | 0    | 0    |
| Stage 1                  | 282    | 282   | -      | 69         | 69     | -     | -      | -    | -    | -     | -    | -    |
| Stage 2                  | 139    | 70    | -      | 294        | 303    | -     | -      | -    | -    | -     | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23   | 7.13       | 6.53   | 6.23  | 4.13   | -    | -    | 4.13  | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -      | 6.13       | 5.53   | -     | -      | -    | -    | -     | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -      | 6.13       | 5.53   | -     | -      | -    | -    | -     | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327  | 3.527      | 4.027  | 3.327 | 2.227  | -    | -    | 2.227 | -    | -    |
| Pot Cap-1 Maneuver       | 541    | 571   | 858    | 591        | 557    | 996   | 1363   | -    | -    | 1529  | -    | -    |
| Stage 1                  | 723    | 676   | -      | 939        | 835    | -     | -      | -    | -    | -     | -    | -    |
| Stage 2                  | 862    | 835   | -      | 712        | 662    | -     | -      | -    | -    | -     | -    | -    |
| Platoon blocked, %       |        |       |        |            |        |       |        | -    | -    | -     | -    | -    |
| Mov Cap-1 Maneuver       | 450    | 549   | 858    | 555        | 535    | 996   | 1363   | -    | -    | 1529  | -    | -    |
| Mov Cap-2 Maneuver       | 450    | 549   | -      | 555        | 535    | -     | -      | -    | -    | -     | -    | -    |
| Stage 1                  | 722    | 651   | -      | 937        | 833    | -     | -      | -    | -    | -     | -    | -    |
| Stage 2                  | 739    | 833   | -      | 661        | 638    | -     | -      | -    | -    | -     | -    | -    |
| Approach                 | EB     |       | WB     |            | NB     |       | SB     |      |      |       |      |      |
| HCM Control Delay, s     | 13.1   |       | 9.7    |            | 0.2    |       | 1.5    |      |      |       |      |      |
| HCM LOS                  | B      |       | A      |            |        |       |        |      |      |       |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR    | EBLn1WBLn1 | SBL    | SBT   | SBR    |      |      |       |      |      |
| Capacity (veh/h)         | 1363   | -     | -      | 498        | 905    | 1529  | -      | -    |      |       |      |      |
| HCM Lane V/C Ratio       | 0.002  | -     | -      | 0.103      | 0.154  | 0.033 | -      | -    |      |       |      |      |
| HCM Control Delay (s)    | 7.6    | 0     | -      | 13.1       | 9.7    | 7.4   | 0      | -    |      |       |      |      |
| HCM Lane LOS             | A      | A     | -      | B          | A      | A     | A      | -    |      |       |      |      |
| HCM 95th %tile Q(veh)    | 0      | -     | -      | 0.3        | 0.5    | 0.1   | -      | -    |      |       |      |      |

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 2.3  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↗    |      |      | ↗    | ↗    | ↗↘   |      | ↗    | ↗↘   |      |
| Traffic Vol, veh/h       | 0    | 0    | 80   | 0    | 0    | 80   | 153  | 1194 | 99   | 114  | 817  | 22   |
| Future Vol, veh/h        | 0    | 0    | 80   | 0    | 0    | 80   | 153  | 1194 | 99   | 114  | 817  | 22   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | 75   | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 87   | 0    | 0    | 87   | 166  | 1298 | 108  | 124  | 888  | 24   |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |   |
|----------------------|--------|---|--------|---|--------|------|--------|---|
| Conflicting Flow All | -      | - | 456    | - | -      | 703  | 912    | 0 |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy        | -      | - | 6.96   | - | -      | 6.96 | 4.16   | - |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | - |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | - |
| Follow-up Hdwy       | -      | - | 3.33   | - | -      | 3.33 | 2.23   | - |
| Pot Cap-1 Maneuver   | 0      | 0 | 549    | 0 | 0      | 378  | 737    | - |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | - |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | - |
| Mov Cap-1 Maneuver   | -      | - | 549    | - | -      | 378  | 737    | - |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | - |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - |

| Approach             | EB   | WB   | NB  | SB  |
|----------------------|------|------|-----|-----|
| HCM Control Delay, s | 12.8 | 17.3 | 1.2 | 1.8 |
| HCM LOS              | B    | C    |     |     |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL  | SBT  | SBR |
|-----------------------|-------|-----|-----|------------|------|------|-----|
| Capacity (veh/h)      | 737   | -   | -   | 549        | 378  | 476  | -   |
| HCM Lane V/C Ratio    | 0.226 | -   | -   | 0.158      | 0.23 | 0.26 | -   |
| HCM Control Delay (s) | 11.3  | -   | -   | 12.8       | 17.3 | 15.2 | -   |
| HCM Lane LOS          | B     | -   | -   | B          | C    | C    | -   |
| HCM 95th %tile Q(veh) | 0.9   | -   | -   | 0.6        | 0.9  | 1    | -   |

# HCM 6th Signalized Intersection Summary

## 2: SR 198 WB Ramps & 12th Avenue

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 71                                                                                | 742                                                                               | 79                                                                                | 1284                                                                              | 0                                                                                 | 0                                                                                 | 817                                                                                 | 470                                                                                 | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 71                                                                                | 742                                                                               | 79                                                                                | 1284                                                                              | 0                                                                                 | 0                                                                                 | 817                                                                                 | 470                                                                                 | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 77                                                                                | 807                                                                               | 86                                                                                | 1396                                                                              | 0                                                                                 | 0                                                                                 | 888                                                                                 | 511                                                                                 |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 535                                                                               | 951                                                                               | 111                                                                               | 2067                                                                              | 0                                                                                 | 0                                                                                 | 1651                                                                                | 736                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.30                                                                              | 0.30                                                                              | 0.06                                                                              | 0.59                                                                              | 0.00                                                                              | 0.00                                                                              | 0.47                                                                                | 0.47                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 77                                                                                | 807                                                                               | 86                                                                                | 1396                                                                              | 0                                                                                 | 0                                                                                 | 888                                                                                 | 511                                                                                 |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 2.6                                                                               | 19.5                                                                              | 3.9                                                                               | 22.0                                                                              | 0.0                                                                               | 0.0                                                                               | 14.5                                                                                | 20.7                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 2.6                                                                               | 19.5                                                                              | 3.9                                                                               | 22.0                                                                              | 0.0                                                                               | 0.0                                                                               | 14.5                                                                                | 20.7                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 535                                                                               | 951                                                                               | 111                                                                               | 2067                                                                              | 0                                                                                 | 0                                                                                 | 1651                                                                                | 736                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.14                                                                              | 0.85                                                                              | 0.78                                                                              | 0.68                                                                              | 0.00                                                                              | 0.00                                                                              | 0.54                                                                                | 0.69                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 731                                                                               | 1301                                                                              | 185                                                                               | 2067                                                                              | 0                                                                                 | 0                                                                                 | 1651                                                                                | 736                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 20.6                                                                              | 26.5                                                                              | 37.4                                                                              | 11.5                                                                              | 0.0                                                                               | 0.0                                                                               | 15.3                                                                                | 17.0                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 0.1                                                                               | 4.0                                                                               | 11.1                                                                              | 1.8                                                                               | 0.0                                                                               | 0.0                                                                               | 1.3                                                                                 | 5.3                                                                                 |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 1.0                                                                               | 7.1                                                                               | 1.9                                                                               | 7.4                                                                               | 0.0                                                                               | 0.0                                                                               | 5.4                                                                                 | 7.6                                                                                 |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 20.7                                                                              | 30.5                                                                              | 48.5                                                                              | 13.3                                                                              | 0.0                                                                               | 0.0                                                                               | 16.6                                                                                | 22.3                                                                                |                                                                                     |                                                                                     |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | D                                                                                 | B                                                                                 | A                                                                                 | A                                                                                 | B                                                                                   | C                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 884                                                                               |                                                                                   |                                                                                   | 1482                                                                              |                                                                                   |                                                                                   | 1399                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 29.7                                                                              |                                                                                   |                                                                                   | 15.3                                                                              |                                                                                   |                                                                                   | 18.7                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 52.0                                                                              |                                                                                   | 9.6                                                                               |                                                                                   | 42.4                                                                              |                                                                                   | 29.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 47.5                                                                              |                                                                                   | 8.5                                                                               |                                                                                   | 34.5                                                                              |                                                                                   | 33.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 24.0                                                                              |                                                                                   | 5.9                                                                               |                                                                                   | 22.7                                                                              |                                                                                   | 21.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 11.0                                                                              |                                                                                   | 0.0                                                                               |                                                                                   | 6.0                                                                               |                                                                                   | 3.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 19.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 3: 12th Avenue & SR 198 EB Off Ramps

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                     |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 664                                                                               | 0                                                                                 | 25                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 697                                                                                 | 189                                                                                 | 0                                                                                   | 510                                                                                 | 375                                                                                 |
| Future Volume (veh/h)        | 664                                                                               | 0                                                                                 | 25                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 697                                                                                 | 189                                                                                 | 0                                                                                   | 510                                                                                 | 375                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 722                                                                               | 0                                                                                 | 27                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 758                                                                                 | 0                                                                                   | 0                                                                                   | 554                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 905                                                                               | 0                                                                                 | 415                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2142                                                                                |                                                                                     | 0                                                                                   | 2142                                                                                |                                                                                     |
| Arrive On Green              | 0.26                                                                              | 0.00                                                                              | 0.26                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.61                                                                                | 0.00                                                                                | 0.00                                                                                | 0.61                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 722                                                                               | 0                                                                                 | 27                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 758                                                                                 | 0                                                                                   | 0                                                                                   | 554                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 13.7                                                                              | 0.0                                                                               | 0.9                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 7.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 5.1                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 13.7                                                                              | 0.0                                                                               | 0.9                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 7.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 5.1                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 905                                                                               | 0                                                                                 | 415                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2142                                                                                |                                                                                     | 0                                                                                   | 2142                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.80                                                                              | 0.00                                                                              | 0.07                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.35                                                                                |                                                                                     | 0.00                                                                                | 0.26                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1886                                                                              | 0                                                                                 | 865                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2142                                                                                |                                                                                     | 0                                                                                   | 2142                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 24.0                                                                              | 0.0                                                                               | 19.3                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 6.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.4                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 1.7                                                                               | 0.0                                                                               | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.3                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 5.1                                                                               | 0.0                                                                               | 0.3                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 2.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 1.5                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 25.7                                                                              | 0.0                                                                               | 19.3                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 7.3                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 6.7                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                   | A                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 749                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 758                                                                                 |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 25.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 7.3                                                                                 |                                                                                     |                                                                                     | 6.7                                                                                 |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 47.0                                                                              |                                                                                   |                                                                                   | 23.0                                                                              |                                                                                   |                                                                                   | 47.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 42.5                                                                              |                                                                                   |                                                                                   | 38.5                                                                              |                                                                                   |                                                                                   | 42.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 9.5                                                                               |                                                                                   |                                                                                   | 15.7                                                                              |                                                                                   |                                                                                   | 7.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 5.5                                                                               |                                                                                   |                                                                                   | 2.7                                                                               |                                                                                   |                                                                                   | 3.8                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 13.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 31                                                                                | 603                                                                               | 87                                                                                | 119                                                                               | 603                                                                               | 66                                                                                | 44                                                                                 | 73                                                                                  | 93                                                                                  | 68                                                                                  | 100                                                                                 | 19                                                                                  |
| Future Volume (veh/h)        | 31                                                                                | 603                                                                               | 87                                                                                | 119                                                                               | 603                                                                               | 66                                                                                | 44                                                                                 | 73                                                                                  | 93                                                                                  | 68                                                                                  | 100                                                                                 | 19                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 34                                                                                | 655                                                                               | 95                                                                                | 129                                                                               | 655                                                                               | 72                                                                                | 48                                                                                 | 79                                                                                  | 101                                                                                 | 74                                                                                  | 109                                                                                 | 21                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 60                                                                                | 860                                                                               | 383                                                                               | 165                                                                               | 1069                                                                              | 477                                                                               | 75                                                                                 | 252                                                                                 | 322                                                                                 | 138                                                                                 | 697                                                                                 | 590                                                                                 |
| Arrive On Green              | 0.03                                                                              | 0.24                                                                              | 0.24                                                                              | 0.09                                                                              | 0.30                                                                              | 0.30                                                                              | 0.04                                                                               | 0.34                                                                                | 0.34                                                                                | 0.08                                                                                | 0.38                                                                                | 0.38                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                               | 740                                                                                 | 946                                                                                 | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 34                                                                                | 655                                                                               | 95                                                                                | 129                                                                               | 655                                                                               | 72                                                                                | 48                                                                                 | 0                                                                                   | 180                                                                                 | 74                                                                                  | 109                                                                                 | 21                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                               | 0                                                                                   | 1685                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.4                                                                               | 12.7                                                                              | 3.6                                                                               | 5.2                                                                               | 11.7                                                                              | 1.8                                                                               | 2.0                                                                                | 0.0                                                                                 | 5.8                                                                                 | 3.0                                                                                 | 2.9                                                                                 | 0.6                                                                                 |
| Cycle Q Clear(g_c), s        | 1.4                                                                               | 12.7                                                                              | 3.6                                                                               | 5.2                                                                               | 11.7                                                                              | 1.8                                                                               | 2.0                                                                                | 0.0                                                                                 | 5.8                                                                                 | 3.0                                                                                 | 2.9                                                                                 | 0.6                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 0.56                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 60                                                                                | 860                                                                               | 383                                                                               | 165                                                                               | 1069                                                                              | 477                                                                               | 75                                                                                 | 0                                                                                   | 573                                                                                 | 138                                                                                 | 697                                                                                 | 590                                                                                 |
| V/C Ratio(X)                 | 0.57                                                                              | 0.76                                                                              | 0.25                                                                              | 0.78                                                                              | 0.61                                                                              | 0.15                                                                              | 0.64                                                                               | 0.00                                                                                | 0.31                                                                                | 0.54                                                                                | 0.16                                                                                | 0.04                                                                                |
| Avail Cap(c_a), veh/h        | 144                                                                               | 1170                                                                              | 522                                                                               | 317                                                                               | 1516                                                                              | 676                                                                               | 163                                                                                | 0                                                                                   | 573                                                                                 | 226                                                                                 | 697                                                                                 | 590                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 35.0                                                                              | 25.8                                                                              | 22.4                                                                              | 32.6                                                                              | 21.9                                                                              | 9.5                                                                               | 34.6                                                                               | 0.0                                                                                 | 17.9                                                                                | 32.6                                                                                | 15.2                                                                                | 14.5                                                                                |
| Incr Delay (d2), s/veh       | 8.1                                                                               | 2.0                                                                               | 0.3                                                                               | 7.9                                                                               | 0.6                                                                               | 0.1                                                                               | 8.7                                                                                | 0.0                                                                                 | 1.4                                                                                 | 3.2                                                                                 | 0.5                                                                                 | 0.1                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.7                                                                               | 5.2                                                                               | 1.3                                                                               | 2.5                                                                               | 4.6                                                                               | 0.8                                                                               | 1.0                                                                                | 0.0                                                                                 | 2.4                                                                                 | 1.4                                                                                 | 1.2                                                                                 | 0.2                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 43.0                                                                              | 27.8                                                                              | 22.7                                                                              | 40.4                                                                              | 22.5                                                                              | 9.6                                                                               | 43.3                                                                               | 0.0                                                                                 | 19.3                                                                                | 35.9                                                                                | 15.7                                                                                | 14.6                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | A                                                                                 | D                                                                                  | A                                                                                   | B                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   | 784                                                                               |                                                                                   |                                                                                   | 856                                                                               |                                                                                   |                                                                                    | 228                                                                                 |                                                                                     |                                                                                     | 204                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   | 27.9                                                                              |                                                                                   |                                                                                   | 24.1                                                                              |                                                                                   |                                                                                    | 24.4                                                                                |                                                                                     |                                                                                     | 22.9                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.2                                                                              | 29.5                                                                              | 11.4                                                                              | 22.4                                                                              | 7.6                                                                               | 32.1                                                                              | 7.0                                                                                | 26.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.4                                                                               | 25.0                                                                              | 13.2                                                                              | 24.4                                                                              | 6.8                                                                               | 27.6                                                                              | 6.0                                                                                | 31.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 5.0                                                                               | 7.8                                                                               | 7.2                                                                               | 14.7                                                                              | 4.0                                                                               | 4.9                                                                               | 3.4                                                                                | 13.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.9                                                                               | 0.1                                                                               | 3.2                                                                               | 0.0                                                                               | 0.6                                                                               | 0.0                                                                                | 4.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 25.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 128                                                                               | 267                                                                               | 170                                                                               | 65                                                                                | 337                                                                               | 65                                                                                | 400                                                                                | 687                                                                                 | 77                                                                                  | 94                                                                                  | 772                                                                                 | 203                                                                                 |
| Future Volume (veh/h)        | 128                                                                               | 267                                                                               | 170                                                                               | 65                                                                                | 337                                                                               | 65                                                                                | 400                                                                                | 687                                                                                 | 77                                                                                  | 94                                                                                  | 772                                                                                 | 203                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 139                                                                               | 290                                                                               | 185                                                                               | 71                                                                                | 366                                                                               | 71                                                                                | 435                                                                                | 747                                                                                 | 84                                                                                  | 102                                                                                 | 839                                                                                 | 221                                                                                 |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 220                                                                               | 665                                                                               | 296                                                                               | 92                                                                                | 521                                                                               | 100                                                                               | 527                                                                                | 1407                                                                                | 158                                                                                 | 131                                                                                 | 1271                                                                                | 567                                                                                 |
| Arrive On Green              | 0.06                                                                              | 0.19                                                                              | 0.19                                                                              | 0.05                                                                              | 0.18                                                                              | 0.18                                                                              | 0.15                                                                               | 0.44                                                                                | 0.44                                                                                | 0.07                                                                                | 0.36                                                                                | 0.36                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 2950                                                                              | 567                                                                               | 3428                                                                               | 3195                                                                                | 359                                                                                 | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 139                                                                               | 290                                                                               | 185                                                                               | 71                                                                                | 217                                                                               | 220                                                                               | 435                                                                                | 412                                                                                 | 419                                                                                 | 102                                                                                 | 839                                                                                 | 221                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1754                                                                              | 1714                                                                               | 1763                                                                                | 1791                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 2.9                                                                               | 5.3                                                                               | 5.2                                                                               | 2.9                                                                               | 8.5                                                                               | 8.7                                                                               | 9.0                                                                                | 12.5                                                                                | 12.6                                                                                | 4.2                                                                                 | 14.7                                                                                | 7.7                                                                                 |
| Cycle Q Clear(g_c), s        | 2.9                                                                               | 5.3                                                                               | 5.2                                                                               | 2.9                                                                               | 8.5                                                                               | 8.7                                                                               | 9.0                                                                                | 12.5                                                                                | 12.6                                                                                | 4.2                                                                                 | 14.7                                                                                | 7.7                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.32                                                                              | 1.00                                                                               |                                                                                     | 0.20                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 220                                                                               | 665                                                                               | 296                                                                               | 92                                                                                | 311                                                                               | 310                                                                               | 527                                                                                | 776                                                                                 | 789                                                                                 | 131                                                                                 | 1271                                                                                | 567                                                                                 |
| V/C Ratio(X)                 | 0.63                                                                              | 0.44                                                                              | 0.62                                                                              | 0.77                                                                              | 0.70                                                                              | 0.71                                                                              | 0.82                                                                               | 0.53                                                                                | 0.53                                                                                | 0.78                                                                                | 0.66                                                                                | 0.39                                                                                |
| Avail Cap(c_a), veh/h        | 233                                                                               | 1276                                                                              | 569                                                                               | 154                                                                               | 672                                                                               | 668                                                                               | 583                                                                                | 776                                                                                 | 789                                                                                 | 204                                                                                 | 1271                                                                                | 567                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 33.5                                                                              | 26.4                                                                              | 11.9                                                                              | 34.4                                                                              | 28.4                                                                              | 28.5                                                                              | 30.1                                                                               | 15.0                                                                                | 15.0                                                                                | 33.4                                                                                | 19.7                                                                                | 17.5                                                                                |
| Incr Delay (d2), s/veh       | 5.0                                                                               | 0.5                                                                               | 2.2                                                                               | 12.7                                                                              | 2.8                                                                               | 3.0                                                                               | 8.7                                                                                | 2.6                                                                                 | 2.6                                                                                 | 9.6                                                                                 | 2.7                                                                                 | 2.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.3                                                                               | 2.2                                                                               | 2.9                                                                               | 1.5                                                                               | 3.6                                                                               | 3.7                                                                               | 4.2                                                                                | 5.0                                                                                 | 5.1                                                                                 | 2.1                                                                                 | 5.9                                                                                 | 2.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 38.6                                                                              | 26.8                                                                              | 14.1                                                                              | 47.1                                                                              | 31.2                                                                              | 31.5                                                                              | 38.8                                                                               | 17.6                                                                                | 17.6                                                                                | 43.0                                                                                | 22.4                                                                                | 19.5                                                                                |
| LnGrp LOS                    | D                                                                                 | C                                                                                 | B                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | C                                                                                   | B                                                                                   |
| Approach Vol, veh/h          | 614                                                                               |                                                                                   |                                                                                   | 508                                                                               |                                                                                   |                                                                                   | 1266                                                                               |                                                                                     |                                                                                     | 1162                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 25.6                                                                              |                                                                                   |                                                                                   | 33.6                                                                              |                                                                                   |                                                                                   | 24.9                                                                               |                                                                                     |                                                                                     | 23.7                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 9.9                                                                               | 36.9                                                                              | 8.3                                                                               | 18.4                                                                              | 15.8                                                                              | 31.0                                                                              | 9.2                                                                                | 17.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.5                                                                               | 30.5                                                                              | 6.4                                                                               | 26.6                                                                              | 12.5                                                                              | 26.5                                                                              | 5.0                                                                                | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 6.2                                                                               | 14.6                                                                              | 4.9                                                                               | 7.3                                                                               | 11.0                                                                              | 16.7                                                                              | 4.9                                                                                | 10.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 4.7                                                                               | 0.0                                                                               | 2.3                                                                               | 0.3                                                                               | 4.5                                                                               | 0.0                                                                                | 2.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 25.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |



# HCM 6th Signalized Intersection Summary

## 8: 11th Avenue & 7th Street

11/02/2020

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|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 57                                                                                | 146                                                                               | 102                                                                               | 113                                                                               | 164                                                                               | 74                                                                                | 238                                                                                 | 685                                                                                 | 152                                                                                 | 110                                                                                 | 498                                                                                 | 99                                                                                  |
| Future Volume (veh/h)        | 57                                                                                | 146                                                                               | 102                                                                               | 113                                                                               | 164                                                                               | 74                                                                                | 238                                                                                 | 685                                                                                 | 152                                                                                 | 110                                                                                 | 498                                                                                 | 99                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                     | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 62                                                                                | 159                                                                               | 111                                                                               | 123                                                                               | 178                                                                               | 80                                                                                | 259                                                                                 | 745                                                                                 | 165                                                                                 | 120                                                                                 | 541                                                                                 | 108                                                                                 |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 171                                                                               | 258                                                                               | 170                                                                               | 155                                                                               | 396                                                                               | 171                                                                               | 303                                                                                 | 1565                                                                                | 698                                                                                 | 153                                                                                 | 1267                                                                                | 565                                                                                 |
| Arrive On Green              | 0.05                                                                              | 0.13                                                                              | 0.13                                                                              | 0.09                                                                              | 0.16                                                                              | 0.16                                                                              | 0.17                                                                                | 0.44                                                                                | 0.44                                                                                | 0.09                                                                                | 0.36                                                                                | 0.36                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 2038                                                                              | 1339                                                                              | 1767                                                                              | 2397                                                                              | 1035                                                                              | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 62                                                                                | 136                                                                               | 134                                                                               | 123                                                                               | 129                                                                               | 129                                                                               | 259                                                                                 | 745                                                                                 | 165                                                                                 | 120                                                                                 | 541                                                                                 | 108                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1614                                                                              | 1767                                                                              | 1763                                                                              | 1669                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 1.2                                                                               | 5.2                                                                               | 5.6                                                                               | 4.8                                                                               | 4.7                                                                               | 4.9                                                                               | 10.1                                                                                | 10.5                                                                                | 2.8                                                                                 | 4.7                                                                                 | 8.2                                                                                 | 3.3                                                                                 |
| Cycle Q Clear(g_c), s        | 1.2                                                                               | 5.2                                                                               | 5.6                                                                               | 4.8                                                                               | 4.7                                                                               | 4.9                                                                               | 10.1                                                                                | 10.5                                                                                | 2.8                                                                                 | 4.7                                                                                 | 8.2                                                                                 | 3.3                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.83                                                                              | 1.00                                                                              |                                                                                   | 0.62                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 171                                                                               | 224                                                                               | 205                                                                               | 155                                                                               | 291                                                                               | 275                                                                               | 303                                                                                 | 1565                                                                                | 698                                                                                 | 153                                                                                 | 1267                                                                                | 565                                                                                 |
| V/C Ratio(X)                 | 0.36                                                                              | 0.61                                                                              | 0.65                                                                              | 0.79                                                                              | 0.44                                                                              | 0.47                                                                              | 0.86                                                                                | 0.48                                                                                | 0.24                                                                                | 0.78                                                                                | 0.43                                                                                | 0.19                                                                                |
| Avail Cap(c_a), veh/h        | 242                                                                               | 648                                                                               | 594                                                                               | 175                                                                               | 698                                                                               | 661                                                                               | 340                                                                                 | 1565                                                                                | 698                                                                                 | 232                                                                                 | 1267                                                                                | 565                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 32.5                                                                              | 29.2                                                                              | 29.4                                                                              | 31.6                                                                              | 26.6                                                                              | 26.7                                                                              | 28.4                                                                                | 13.9                                                                                | 4.6                                                                                 | 31.6                                                                                | 17.1                                                                                | 15.6                                                                                |
| Incr Delay (d2), s/veh       | 1.3                                                                               | 2.7                                                                               | 3.5                                                                               | 19.4                                                                              | 1.1                                                                               | 1.2                                                                               | 17.4                                                                                | 1.0                                                                                 | 0.8                                                                                 | 9.4                                                                                 | 1.1                                                                                 | 0.8                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.5                                                                               | 2.2                                                                               | 2.2                                                                               | 2.9                                                                               | 2.0                                                                               | 2.0                                                                               | 5.5                                                                                 | 3.9                                                                                 | 1.6                                                                                 | 2.3                                                                                 | 3.2                                                                                 | 1.3                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 33.8                                                                              | 31.9                                                                              | 32.9                                                                              | 51.0                                                                              | 27.6                                                                              | 27.9                                                                              | 45.9                                                                                | 14.9                                                                                | 5.4                                                                                 | 41.0                                                                                | 18.2                                                                                | 16.3                                                                                |
| LnGrp LOS                    | C                                                                                 | C                                                                                 | C                                                                                 | D                                                                                 | C                                                                                 | C                                                                                 | D                                                                                   | B                                                                                   | A                                                                                   | D                                                                                   | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                   | 332                                                                               |                                                                                   |                                                                                   | 381                                                                               |                                                                                   |                                                                                     | 1169                                                                                |                                                                                     |                                                                                     | 769                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                   | 32.6                                                                              |                                                                                   |                                                                                   | 35.3                                                                              |                                                                                   |                                                                                     | 20.4                                                                                |                                                                                     |                                                                                     | 21.5                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 10.6                                                                              | 35.9                                                                              | 10.7                                                                              | 13.5                                                                              | 16.6                                                                              | 29.9                                                                              | 8.0                                                                                 | 16.2                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 9.3                                                                               | 29.7                                                                              | 7.0                                                                               | 26.0                                                                              | 13.6                                                                              | 25.4                                                                              | 5.0                                                                                 | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 6.7                                                                               | 12.5                                                                              | 6.8                                                                               | 7.6                                                                               | 12.1                                                                              | 10.2                                                                              | 3.2                                                                                 | 6.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.1                                                                               | 5.2                                                                               | 0.0                                                                               | 1.4                                                                               | 0.1                                                                               | 3.4                                                                               | 0.0                                                                                 | 1.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 24.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

11/02/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 50                                                                                | 0                                                                                 | 64                                                                                | 6                                                                                 | 0                                                                                 | 8                                                                                 | 181                                                                                 | 1387                                                                                | 36                                                                                  | 2                                                                                   | 778                                                                                 | 119                                                                                 |
| Future Volume (veh/h)        | 50                                                                                | 0                                                                                 | 64                                                                                | 6                                                                                 | 0                                                                                 | 8                                                                                 | 181                                                                                 | 1387                                                                                | 36                                                                                  | 2                                                                                   | 778                                                                                 | 119                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 54                                                                                | 0                                                                                 | 70                                                                                | 7                                                                                 | 0                                                                                 | 9                                                                                 | 197                                                                                 | 1508                                                                                | 39                                                                                  | 2                                                                                   | 846                                                                                 | 129                                                                                 |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 233                                                                               | 0                                                                                 | 118                                                                               | 101                                                                               | 21                                                                                | 53                                                                                | 378                                                                                 | 2497                                                                                | 64                                                                                  | 5                                                                                   | 1763                                                                                | 787                                                                                 |
| Arrive On Green              | 0.08                                                                              | 0.00                                                                              | 0.08                                                                              | 0.08                                                                              | 0.00                                                                              | 0.08                                                                              | 0.21                                                                                | 0.71                                                                                | 0.71                                                                                | 0.00                                                                                | 0.50                                                                                | 0.50                                                                                |
| Sat Flow, veh/h              | 1395                                                                              | 0                                                                                 | 1572                                                                              | 270                                                                               | 277                                                                               | 704                                                                               | 1767                                                                                | 3511                                                                                | 91                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 54                                                                                | 0                                                                                 | 70                                                                                | 16                                                                                | 0                                                                                 | 0                                                                                 | 197                                                                                 | 756                                                                                 | 791                                                                                 | 2                                                                                   | 846                                                                                 | 129                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1395                                                                              | 0                                                                                 | 1572                                                                              | 1252                                                                              | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1839                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 0.0                                                                               | 0.0                                                                               | 2.8                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 6.3                                                                                 | 13.9                                                                                | 13.9                                                                                | 0.1                                                                                 | 10.1                                                                                | 2.9                                                                                 |
| Cycle Q Clear(g_c), s        | 1.9                                                                               | 0.0                                                                               | 2.8                                                                               | 2.8                                                                               | 0.0                                                                               | 0.0                                                                               | 6.3                                                                                 | 13.9                                                                                | 13.9                                                                                | 0.1                                                                                 | 10.1                                                                                | 2.9                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.44                                                                              |                                                                                   | 0.56                                                                              | 1.00                                                                                |                                                                                     | 0.05                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 233                                                                               | 0                                                                                 | 118                                                                               | 175                                                                               | 0                                                                                 | 0                                                                                 | 378                                                                                 | 1254                                                                                | 1308                                                                                | 5                                                                                   | 1763                                                                                | 787                                                                                 |
| V/C Ratio(X)                 | 0.23                                                                              | 0.00                                                                              | 0.59                                                                              | 0.09                                                                              | 0.00                                                                              | 0.00                                                                              | 0.52                                                                                | 0.60                                                                                | 0.60                                                                                | 0.41                                                                                | 0.48                                                                                | 0.16                                                                                |
| Avail Cap(c_a), veh/h        | 696                                                                               | 0                                                                                 | 639                                                                               | 656                                                                               | 0                                                                                 | 0                                                                                 | 511                                                                                 | 1254                                                                                | 1308                                                                                | 138                                                                                 | 1763                                                                                | 787                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 28.2                                                                              | 0.0                                                                               | 28.6                                                                              | 27.6                                                                              | 0.0                                                                               | 0.0                                                                               | 22.3                                                                                | 4.7                                                                                 | 4.7                                                                                 | 31.8                                                                                | 10.5                                                                                | 8.7                                                                                 |
| Incr Delay (d2), s/veh       | 0.5                                                                               | 0.0                                                                               | 4.7                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 1.1                                                                                 | 2.2                                                                                 | 2.1                                                                                 | 48.3                                                                                | 0.9                                                                                 | 0.4                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 0.8                                                                               | 0.0                                                                               | 1.1                                                                               | 0.2                                                                               | 0.0                                                                               | 0.0                                                                               | 2.6                                                                                 | 3.7                                                                                 | 3.9                                                                                 | 0.1                                                                                 | 3.6                                                                                 | 0.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 28.7                                                                              | 0.0                                                                               | 33.3                                                                              | 27.9                                                                              | 0.0                                                                               | 0.0                                                                               | 23.4                                                                                | 6.8                                                                                 | 6.8                                                                                 | 80.1                                                                                | 11.5                                                                                | 9.2                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | C                                                                                   | A                                                                                   | A                                                                                   | F                                                                                   | B                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 124                                                                               |                                                                                   |                                                                                   | 16                                                                                |                                                                                   |                                                                                   | 1744                                                                                |                                                                                     |                                                                                     | 977                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 31.3                                                                              |                                                                                   |                                                                                   | 27.9                                                                              |                                                                                   |                                                                                   | 8.7                                                                                 |                                                                                     |                                                                                     | 11.3                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | A                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 4.7                                                                               | 50.0                                                                              | 9.3                                                                               |                                                                                   | 18.2                                                                              | 36.5                                                                              | 9.3                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.0                                                                               | 45.5                                                                              | 26.0                                                                              |                                                                                   | 18.5                                                                              | 32.0                                                                              | 26.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 2.1                                                                               | 15.9                                                                              | 4.8                                                                               |                                                                                   | 8.3                                                                               | 12.1                                                                              | 4.8                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 14.4                                                                              | 0.5                                                                               |                                                                                   | 0.4                                                                               | 6.5                                                                               | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 10.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

11/02/2020

|                              |  |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
|------------------------------|------------------------------------------------------------------------------------|------|-----|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                | EBT  | EBR | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                    |      |     |  |  |  |  |  |      |      |  |  |
| Traffic Volume (veh/h)       | 0                                                                                  | 0    | 0   | 182                                                                               | 25                                                                                | 454                                                                               | 80                                                                                  | 1161                                                                                | 0    | 0    | 642                                                                                 | 252                                                                                 |
| Future Volume (veh/h)        | 0                                                                                  | 0    | 0   | 182                                                                               | 25                                                                                | 454                                                                               | 80                                                                                  | 1161                                                                                | 0    | 0    | 642                                                                                 | 252                                                                                 |
| Initial Q (Qb), veh          |                                                                                    |      |     | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0    | 0    | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00 | 1.00 |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                    |      |     | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |      |      | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                    |      |     | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0    | 0    | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                    |      |     | 198                                                                               | 27                                                                                | 493                                                                               | 87                                                                                  | 1262                                                                                | 0    | 0    | 698                                                                                 | 274                                                                                 |
| Peak Hour Factor             |                                                                                    |      |     | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92 | 0.92 | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         |                                                                                    |      |     | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0    | 0    | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                    |      |     | 615                                                                               | 646                                                                               | 547                                                                               | 112                                                                                 | 1904                                                                                | 0    | 0    | 1484                                                                                | 662                                                                                 |
| Arrive On Green              |                                                                                    |      |     | 0.35                                                                              | 0.35                                                                              | 0.35                                                                              | 0.06                                                                                | 0.54                                                                                | 0.00 | 0.00 | 0.42                                                                                | 0.42                                                                                |
| Sat Flow, veh/h              |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0    | 0    | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                    |      |     | 198                                                                               | 27                                                                                | 493                                                                               | 87                                                                                  | 1262                                                                                | 0    | 0    | 698                                                                                 | 274                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                    |      |     | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0    | 0    | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                    |      |     | 6.6                                                                               | 0.8                                                                               | 24.0                                                                              | 3.9                                                                                 | 20.6                                                                                | 0.0  | 0.0  | 11.5                                                                                | 9.8                                                                                 |
| Cycle Q Clear(g_c), s        |                                                                                    |      |     | 6.6                                                                               | 0.8                                                                               | 24.0                                                                              | 3.9                                                                                 | 20.6                                                                                | 0.0  | 0.0  | 11.5                                                                                | 9.8                                                                                 |
| Prop In Lane                 |                                                                                    |      |     | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00 | 0.00 |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                    |      |     | 615                                                                               | 646                                                                               | 547                                                                               | 112                                                                                 | 1904                                                                                | 0    | 0    | 1484                                                                                | 662                                                                                 |
| V/C Ratio(X)                 |                                                                                    |      |     | 0.32                                                                              | 0.04                                                                              | 0.90                                                                              | 0.78                                                                                | 0.66                                                                                | 0.00 | 0.00 | 0.47                                                                                | 0.41                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                    |      |     | 823                                                                               | 864                                                                               | 732                                                                               | 224                                                                                 | 1904                                                                                | 0    | 0    | 1484                                                                                | 662                                                                                 |
| HCM Platoon Ratio            |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00 | 1.00 | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           |                                                                                    |      |     | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00 | 0.00 | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                    |      |     | 19.3                                                                              | 17.4                                                                              | 24.9                                                                              | 37.1                                                                                | 13.3                                                                                | 0.0  | 0.0  | 16.8                                                                                | 16.4                                                                                |
| Incr Delay (d2), s/veh       |                                                                                    |      |     | 0.3                                                                               | 0.0                                                                               | 11.6                                                                              | 10.8                                                                                | 1.8                                                                                 | 0.0  | 0.0  | 1.1                                                                                 | 1.9                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                    |      |     | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0  | 0.0  | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                    |      |     | 2.5                                                                               | 0.3                                                                               | 9.7                                                                               | 2.0                                                                                 | 7.8                                                                                 | 0.0  | 0.0  | 4.5                                                                                 | 3.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                    |      |     | 19.6                                                                              | 17.4                                                                              | 36.5                                                                              | 47.9                                                                                | 15.1                                                                                | 0.0  | 0.0  | 17.9                                                                                | 18.3                                                                                |
| LnGrp LOS                    |                                                                                    |      |     | B                                                                                 | B                                                                                 | D                                                                                 | D                                                                                   | B                                                                                   | A    | A    | B                                                                                   | B                                                                                   |
| Approach Vol, veh/h          |                                                                                    |      |     |                                                                                   | 718                                                                               |                                                                                   |                                                                                     | 1349                                                                                |      |      | 972                                                                                 |                                                                                     |
| Approach Delay, s/veh        |                                                                                    |      |     |                                                                                   | 31.1                                                                              |                                                                                   |                                                                                     | 17.2                                                                                |      |      | 18.0                                                                                |                                                                                     |
| Approach LOS                 |                                                                                    |      |     |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | B                                                                                   |      |      | B                                                                                   |                                                                                     |
| Timer - Assigned Phs         |                                                                                    | 2    |     |                                                                                   | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |      |      |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                    | 48.0 |     |                                                                                   | 9.6                                                                               | 38.4                                                                              |                                                                                     | 32.5                                                                                |      |      |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                    | 4.5  |     |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |      |      |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                    | 43.5 |     |                                                                                   | 10.2                                                                              | 28.8                                                                              |                                                                                     | 37.5                                                                                |      |      |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s |                                                                                    | 22.6 |     |                                                                                   | 5.9                                                                               | 13.5                                                                              |                                                                                     | 26.0                                                                                |      |      |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                    | 9.8  |     |                                                                                   | 0.1                                                                               | 5.0                                                                               |                                                                                     | 2.1                                                                                 |      |      |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                    |      |     |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                    |      |     | 20.8                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                    |      |     | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |      |      |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/02/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |                                                                                     |
| Traffic Volume (veh/h)       | 373                                                                               | 216                                                                               | 131                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 872                                                                                 | 207                                                                                 | 171                                                                                 | 658                                                                                 | 0                                                                                   |
| Future Volume (veh/h)        | 373                                                                               | 216                                                                               | 131                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 872                                                                                 | 207                                                                                 | 171                                                                                 | 658                                                                                 | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 405                                                                               | 235                                                                               | 142                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 948                                                                                 | 225                                                                                 | 186                                                                                 | 715                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 438                                                                               | 254                                                                               | 606                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1180                                                                                | 526                                                                                 | 221                                                                                 | 1803                                                                                | 0                                                                                   |
| Arrive On Green              | 0.39                                                                              | 0.39                                                                              | 0.39                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.33                                                                                | 0.33                                                                                | 0.12                                                                                | 0.51                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 1138                                                                              | 660                                                                               | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 640                                                                               | 0                                                                                 | 142                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 948                                                                                 | 225                                                                                 | 186                                                                                 | 715                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1799                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 29.6                                                                              | 0.0                                                                               | 5.3                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 21.3                                                                                | 9.7                                                                                 | 9.0                                                                                 | 10.8                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 29.6                                                                              | 0.0                                                                               | 5.3                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 21.3                                                                                | 9.7                                                                                 | 9.0                                                                                 | 10.8                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 0.63                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 693                                                                               | 0                                                                                 | 606                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1180                                                                                | 526                                                                                 | 221                                                                                 | 1803                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 0.92                                                                              | 0.00                                                                              | 0.23                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.80                                                                                | 0.43                                                                                | 0.84                                                                                | 0.40                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 754                                                                               | 0                                                                                 | 660                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1180                                                                                | 526                                                                                 | 234                                                                                 | 1803                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 25.5                                                                              | 0.0                                                                               | 18.1                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 26.3                                                                                | 22.5                                                                                | 37.2                                                                                | 13.0                                                                                | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 16.3                                                                              | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 5.8                                                                                 | 2.5                                                                                 | 22.6                                                                                | 0.7                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 14.3                                                                              | 0.0                                                                               | 1.8                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 9.2                                                                                 | 3.7                                                                                 | 5.2                                                                                 | 4.2                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 41.8                                                                              | 0.0                                                                               | 18.3                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 32.2                                                                                | 25.0                                                                                | 59.8                                                                                | 13.7                                                                                | 0.0                                                                                 |
| LnGrp LOS                    | D                                                                                 | A                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | C                                                                                   | C                                                                                   | E                                                                                   | B                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 782                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1173                                                                               |                                                                                     |                                                                                     | 901                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 37.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 30.8                                                                               |                                                                                     |                                                                                     | 23.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 15.4                                                                              | 33.6                                                                              | 38.0                                                                              |                                                                                   | 49.0                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 11.5                                                                              | 28.5                                                                              | 36.5                                                                              |                                                                                   | 44.5                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 11.0                                                                              | 23.3                                                                              | 31.6                                                                              |                                                                                   | 12.8                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 3.0                                                                               | 2.0                                                                               |                                                                                   | 5.6                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 30.2                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

11/02/2020

| Intersection              |    |
|---------------------------|----|
| Intersection Delay, s/veh | 15 |
| Intersection LOS          | B  |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 127                                                                               | 181                                                                               | 48   | 51                                                                                | 223                                                                               | 48   | 43   | 122                                                                                 | 30   | 34   | 140                                                                                 | 51   |
| Future Vol, veh/h   | 127                                                                               | 181                                                                               | 48   | 51                                                                                | 223                                                                               | 48   | 43   | 122                                                                                 | 30   | 34   | 140                                                                                 | 51   |
| Peak Hour Factor    | 0.92                                                                              | 0.92                                                                              | 0.92 | 0.92                                                                              | 0.92                                                                              | 0.92 | 0.92 | 0.92                                                                                | 0.92 | 0.92 | 0.92                                                                                | 0.92 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 138                                                                               | 197                                                                               | 52   | 55                                                                                | 242                                                                               | 52   | 47   | 133                                                                                 | 33   | 37   | 152                                                                                 | 55   |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 2    | 2    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 2    | 2    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 2    | 2    |
| HCM Control Delay          | 14.3 | 16.4 | 14.1 | 14.9 |
| HCM LOS                    | B    | C    | B    | B    |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 22%   | 100%  | 0%    | 100%  | 0%    | 15%   |
| Vol Thru, %            | 63%   | 0%    | 79%   | 0%    | 82%   | 62%   |
| Vol Right, %           | 15%   | 0%    | 21%   | 0%    | 18%   | 23%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 195   | 127   | 229   | 51    | 271   | 225   |
| LT Vol                 | 43    | 127   | 0     | 51    | 0     | 34    |
| Through Vol            | 122   | 0     | 181   | 0     | 223   | 140   |
| RT Vol                 | 30    | 0     | 48    | 0     | 48    | 51    |
| Lane Flow Rate         | 212   | 138   | 249   | 55    | 295   | 245   |
| Geometry Grp           | 2     | 7     | 7     | 7     | 7     | 2     |
| Degree of Util (X)     | 0.396 | 0.28  | 0.46  | 0.113 | 0.55  | 0.447 |
| Departure Headway (Hd) | 6.721 | 7.311 | 6.648 | 7.357 | 6.718 | 6.576 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 534   | 491   | 540   | 487   | 536   | 548   |
| Service Time           | 4.773 | 5.06  | 4.397 | 5.106 | 4.466 | 4.625 |
| HCM Lane V/C Ratio     | 0.397 | 0.281 | 0.461 | 0.113 | 0.55  | 0.447 |
| HCM Control Delay      | 14.1  | 12.9  | 15    | 11    | 17.4  | 14.9  |
| HCM Lane LOS           | B     | B     | B     | B     | C     | B     |
| HCM 95th-tile Q        | 1.9   | 1.1   | 2.4   | 0.4   | 3.3   | 2.3   |

HCM 6th TWSC  
1: 12th Avenue & Glendale Avenue

11/02/2020

| Intersection             |       |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
|--------------------------|-------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 117.3 |      |                                                                                   |      |      |                                                                                   |      |                                                                                   |      |                                                                                     |                                                                                     |      |
| Movement                 | EBL   | EBT  | EBR                                                                               | WBL  | WBT  | WBR                                                                               | NBL  | NBT                                                                               | NBR  | SBL                                                                                 | SBT                                                                                 | SBR  |
| Lane Configurations      |       |      |  |      |      |  |      |  |      |  |  |      |
| Traffic Vol, veh/h       | 0     | 0    | 255                                                                               | 0    | 0    | 296                                                                               | 0    | 2631                                                                              | 110  | 69                                                                                  | 2855                                                                                | 249  |
| Future Vol, veh/h        | 0     | 0    | 255                                                                               | 0    | 0    | 296                                                                               | 0    | 2631                                                                              | 110  | 69                                                                                  | 2855                                                                                | 249  |
| Conflicting Peds, #/hr   | 0     | 0    | 0                                                                                 | 0    | 0    | 0                                                                                 | 0    | 0                                                                                 | 0    | 0                                                                                   | 0                                                                                   | 0    |
| Sign Control             | Stop  | Stop | Stop                                                                              | Stop | Stop | Stop                                                                              | Free | Free                                                                              | Free | Free                                                                                | Free                                                                                | Free |
| RT Channelized           | -     | -    | None                                                                              | -    | -    | None                                                                              | -    | -                                                                                 | None | -                                                                                   | -                                                                                   | None |
| Storage Length           | -     | -    | 0                                                                                 | -    | -    | 0                                                                                 | -    | -                                                                                 | -    | 125                                                                                 | -                                                                                   | -    |
| Veh in Median Storage, # | -     | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Grade, %                 | -     | 0    | -                                                                                 | -    | 0    | -                                                                                 | -    | 0                                                                                 | -    | -                                                                                   | 0                                                                                   | -    |
| Peak Hour Factor         | 92    | 92   | 92                                                                                | 92   | 92   | 92                                                                                | 92   | 92                                                                                | 92   | 92                                                                                  | 92                                                                                  | 92   |
| Heavy Vehicles, %        | 3     | 3    | 3                                                                                 | 3    | 3    | 3                                                                                 | 3    | 3                                                                                 | 3    | 3                                                                                   | 3                                                                                   | 3    |
| Mvmt Flow                | 0     | 0    | 277                                                                               | 0    | 0    | 322                                                                               | 0    | 2860                                                                              | 120  | 75                                                                                  | 3103                                                                                | 271  |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |      |
|----------------------|--------|---|--------|---|--------|------|--------|------|
| Conflicting Flow All | -      | - | 1687   | - | -      | 1490 | -      | 0    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy        | -      | - | 7.16   | - | -      | 7.16 | -      | 5.36 |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | -    |
| Follow-up Hdwy       | -      | - | 3.93   | - | -      | 3.93 | -      | 3.13 |
| Pot Cap-1 Maneuver   | 0      | 0 | ~ 70   | 0 | 0      | ~ 96 | 0      | ~ 38 |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | 0      | -    |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | 0      | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | ~ 70   | - | -      | ~ 96 | -      | ~ 38 |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | -    |
| Stage 1              | -      | - | -      | - | -      | -    | -      | -    |
| Stage 2              | -      | - | -      | - | -      | -    | -      | -    |

| Approach              | EB     | WB     | NB | SB   |
|-----------------------|--------|--------|----|------|
| HCM Control Delay, \$ | 1453.8 | 1151.6 | 0  | 14.8 |
| HCM LOS               | F      | F      |    |      |

| Minor Lane/Major Mvmt | NBT | NBR | EBLn1WBLn1 | SBL       | SBT      | SBR |
|-----------------------|-----|-----|------------|-----------|----------|-----|
| Capacity (veh/h)      | -   | -   | 70         | 96        | ~ 38     | -   |
| HCM Lane V/C Ratio    | -   | -   | 3.96       | 3.351     | 1.974    | -   |
| HCM Control Delay (s) | -   | -   | \$ 1453.8  | \$ 1151.6 | \$ 682.3 | -   |
| HCM Lane LOS          | -   | -   | F          | F         | F        | -   |
| HCM 95th %tile Q(veh) | -   | -   | 29.4       | 32        | 8.1      | -   |

| Notes                      |                        |                            |                                |
|----------------------------|------------------------|----------------------------|--------------------------------|
| ~: Volume exceeds capacity | \$: Delay exceeds 300s | +: Computation Not Defined | *: All major volume in platoon |



HCM 6th TWSC  
6: Campus Dr & 6th Street

11/02/2020

| Intersection             |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|--------------------------|--------|-----------------------------------------------------------------------------------|--------|------------|-----------------------------------------------------------------------------------|-------|--------|-----------------------------------------------------------------------------------|------|-------|-------------------------------------------------------------------------------------|------|
| Int Delay, s/veh         | 4.8    |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Movement                 | EBL    | EBT                                                                               | EBR    | WBL        | WBT                                                                               | WBR   | NBL    | NBT                                                                               | NBR  | SBL   | SBT                                                                                 | SBR  |
| Lane Configurations      |        |  |        |            |  |       |        |  |      |       |  |      |
| Traffic Vol, veh/h       | 19     | 12                                                                                | 0      | 0          | 6                                                                                 | 107   | 0      | 146                                                                               | 0    | 94    | 79                                                                                  | 22   |
| Future Vol, veh/h        | 19     | 12                                                                                | 0      | 0          | 6                                                                                 | 107   | 0      | 146                                                                               | 0    | 94    | 79                                                                                  | 22   |
| Conflicting Peds, #/hr   | 0      | 0                                                                                 | 0      | 0          | 0                                                                                 | 0     | 0      | 0                                                                                 | 0    | 0     | 0                                                                                   | 0    |
| Sign Control             | Stop   | Stop                                                                              | Stop   | Stop       | Stop                                                                              | Stop  | Free   | Free                                                                              | Free | Free  | Free                                                                                | Free |
| RT Channelized           | -      | -                                                                                 | None   | -          | -                                                                                 | None  | -      | -                                                                                 | None | -     | -                                                                                   | None |
| Storage Length           | -      | -                                                                                 | -      | -          | -                                                                                 | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Veh in Median Storage, # | -      | 0                                                                                 | -      | -          | 0                                                                                 | -     | -      | 0                                                                                 | -    | -     | 0                                                                                   | -    |
| Grade, %                 | -      | 0                                                                                 | -      | -          | 0                                                                                 | -     | -      | 0                                                                                 | -    | -     | 0                                                                                   | -    |
| Peak Hour Factor         | 92     | 92                                                                                | 92     | 92         | 92                                                                                | 92    | 92     | 92                                                                                | 92   | 92    | 92                                                                                  | 92   |
| Heavy Vehicles, %        | 3      | 3                                                                                 | 3      | 3          | 3                                                                                 | 3     | 3      | 3                                                                                 | 3    | 3     | 3                                                                                   | 3    |
| Mvmt Flow                | 21     | 13                                                                                | 0      | 0          | 7                                                                                 | 116   | 0      | 159                                                                               | 0    | 102   | 86                                                                                  | 24   |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Major/Minor              | Minor2 |                                                                                   | Minor1 |            | Major1                                                                            |       | Major2 |                                                                                   |      |       |                                                                                     |      |
| Conflicting Flow All     | 523    | 461                                                                               | 98     | 468        | 473                                                                               | 159   | 110    | 0                                                                                 | 0    | 159   | 0                                                                                   | 0    |
| Stage 1                  | 302    | 302                                                                               | -      | 159        | 159                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 221    | 159                                                                               | -      | 309        | 314                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Critical Hdwy            | 7.13   | 6.53                                                                              | 6.23   | 7.13       | 6.53                                                                              | 6.23  | 4.13   | -                                                                                 | -    | 4.13  | -                                                                                   | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53                                                                              | -      | 6.13       | 5.53                                                                              | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53                                                                              | -      | 6.13       | 5.53                                                                              | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Follow-up Hdwy           | 3.527  | 4.027                                                                             | 3.327  | 3.527      | 4.027                                                                             | 3.327 | 2.227  | -                                                                                 | -    | 2.227 | -                                                                                   | -    |
| Pot Cap-1 Maneuver       | 463    | 496                                                                               | 955    | 504        | 488                                                                               | 884   | 1474   | -                                                                                 | -    | 1414  | -                                                                                   | -    |
| Stage 1                  | 705    | 662                                                                               | -      | 841        | 764                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 779    | 764                                                                               | -      | 699        | 654                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Platoon blocked, %       |        |                                                                                   |        |            |                                                                                   |       |        | -                                                                                 | -    |       | -                                                                                   | -    |
| Mov Cap-1 Maneuver       | 374    | 458                                                                               | 955    | 464        | 450                                                                               | 884   | 1474   | -                                                                                 | -    | 1414  | -                                                                                   | -    |
| Mov Cap-2 Maneuver       | 374    | 458                                                                               | -      | 464        | 450                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 1                  | 705    | 611                                                                               | -      | 841        | 764                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
| Stage 2                  | 671    | 764                                                                               | -      | 631        | 604                                                                               | -     | -      | -                                                                                 | -    | -     | -                                                                                   | -    |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Approach                 | EB     |                                                                                   | WB     |            | NB                                                                                |       | SB     |                                                                                   |      |       |                                                                                     |      |
| HCM Control Delay, s     | 14.7   |                                                                                   | 10     |            | 0                                                                                 |       | 3.7    |                                                                                   |      |       |                                                                                     |      |
| HCM LOS                  | B      |                                                                                   | B      |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
|                          |        |                                                                                   |        |            |                                                                                   |       |        |                                                                                   |      |       |                                                                                     |      |
| Minor Lane/Major Mvmt    | NBL    | NBT                                                                               | NBR    | EBLn1WBLn1 | SBL                                                                               | SBT   | SBR    |                                                                                   |      |       |                                                                                     |      |
| Capacity (veh/h)         | 1474   | -                                                                                 | -      | 403        | 841                                                                               | 1414  | -      | -                                                                                 |      |       |                                                                                     |      |
| HCM Lane V/C Ratio       | -      | -                                                                                 | -      | 0.084      | 0.146                                                                             | 0.072 | -      | -                                                                                 |      |       |                                                                                     |      |
| HCM Control Delay (s)    | 0      | -                                                                                 | -      | 14.7       | 10                                                                                | 7.7   | 0      | -                                                                                 |      |       |                                                                                     |      |
| HCM Lane LOS             | A      | -                                                                                 | -      | B          | B                                                                                 | A     | A      | -                                                                                 |      |       |                                                                                     |      |
| HCM 95th %tile Q(veh)    | 0      | -                                                                                 | -      | 0.3        | 0.5                                                                               | 0.2   | -      | -                                                                                 |      |       |                                                                                     |      |

| Intersection             |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Int Delay, s/veh         | 7.6  |      |      |      |      |      |      |      |      |      |      |      |
| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
| Lane Configurations      |      |      | ↰    |      |      | ↰    | ↰    | ↰↱   |      | ↰    | ↰↱   |      |
| Traffic Vol, veh/h       | 0    | 0    | 105  | 0    | 0    | 249  | 152  | 1628 | 162  | 165  | 1705 | 12   |
| Future Vol, veh/h        | 0    | 0    | 105  | 0    | 0    | 249  | 152  | 1628 | 162  | 165  | 1705 | 12   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | 75   | -    | -    | 125  | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 0    | 108  | 0    | 0    | 257  | 157  | 1678 | 167  | 170  | 1758 | 12   |

| Major/Minor          | Minor2 |   | Minor1 |   | Major1 |      | Major2 |   |   |      |   |   |
|----------------------|--------|---|--------|---|--------|------|--------|---|---|------|---|---|
| Conflicting Flow All | -      | - | 885    | - | -      | 923  | 1770   | 0 | 0 | 1845 | 0 | 0 |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Critical Hdwy        | -      | - | 6.96   | - | -      | 6.96 | 4.16   | - | - | 4.16 | - | - |
| Critical Hdwy Stg 1  | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Critical Hdwy Stg 2  | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Follow-up Hdwy       | -      | - | 3.33   | - | -      | 3.33 | 2.23   | - | - | 2.23 | - | - |
| Pot Cap-1 Maneuver   | 0      | 0 | 286    | 0 | 0      | 270  | 344    | - | - | 321  | - | - |
| Stage 1              | 0      | 0 | -      | 0 | 0      | -    | -      | - | - | -    | - | - |
| Stage 2              | 0      | 0 | -      | 0 | 0      | -    | -      | - | - | -    | - | - |
| Platoon blocked, %   | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Mov Cap-1 Maneuver   | -      | - | 286    | - | -      | 270  | 344    | - | - | 321  | - | - |
| Mov Cap-2 Maneuver   | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Stage 1              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |
| Stage 2              | -      | - | -      | - | -      | -    | -      | - | - | -    | - | - |

| Approach             | EB   |  | WB   |  | NB  |  | SB  |  |
|----------------------|------|--|------|--|-----|--|-----|--|
| HCM Control Delay, s | 25.1 |  | 83.6 |  | 1.9 |  | 2.5 |  |
| HCM LOS              | D    |  | F    |  |     |  |     |  |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1 | SBL   | SBT  | SBR |
|-----------------------|-------|-----|-----|------------|-------|------|-----|
| Capacity (veh/h)      | 344   | -   | -   | 286        | 270   | 321  | -   |
| HCM Lane V/C Ratio    | 0.456 | -   | -   | 0.378      | 0.951 | 0.53 | -   |
| HCM Control Delay (s) | 23.9  | -   | -   | 25.1       | 83.6  | 28.2 | -   |
| HCM Lane LOS          | C     | -   | -   | D          | F     | D    | -   |
| HCM 95th %tile Q(veh) | 2.3   | -   | -   | 1.7        | 9     | 2.9  | -   |

## HCM 6th Signalized Intersection Summary

### 2: SR 198 WB Ramps & 12th Avenue

11/11/2020

|                              |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | WBL                                                                               | WBR                                                                               | NBL                                                                               | NBT                                                                               | NBR                                                                               | SBL                                                                               | SBT                                                                                 | SBR                                                                                 | NEL                                                                                 | NER                                                                                 |
| Lane Configurations          |  |  |  |  |                                                                                   |                                                                                   |  |  |                                                                                     |                                                                                     |
| Traffic Volume (veh/h)       | 221                                                                               | 848                                                                               | 71                                                                                | 1899                                                                              | 0                                                                                 | 0                                                                                 | 2032                                                                                | 1088                                                                                | 0                                                                                   | 0                                                                                   |
| Future Volume (veh/h)        | 221                                                                               | 848                                                                               | 71                                                                                | 1899                                                                              | 0                                                                                 | 0                                                                                 | 2032                                                                                | 1088                                                                                | 0                                                                                   | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   |                                                                                     |                                                                                     |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 0                                                                                 | 0                                                                                 | 1856                                                                                | 1856                                                                                |                                                                                     |                                                                                     |
| Adj Flow Rate, veh/h         | 240                                                                               | 922                                                                               | 77                                                                                | 2064                                                                              | 0                                                                                 | 0                                                                                 | 2209                                                                                | 1183                                                                                |                                                                                     |                                                                                     |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                |                                                                                     |                                                                                     |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 0                                                                                 | 0                                                                                 | 3                                                                                   | 3                                                                                   |                                                                                     |                                                                                     |
| Cap, veh/h                   | 434                                                                               | 773                                                                               | 81                                                                                | 2394                                                                              | 0                                                                                 | 0                                                                                 | 2101                                                                                | 937                                                                                 |                                                                                     |                                                                                     |
| Arrive On Green              | 0.25                                                                              | 0.25                                                                              | 0.05                                                                              | 0.68                                                                              | 0.00                                                                              | 0.00                                                                              | 0.60                                                                                | 0.60                                                                                |                                                                                     |                                                                                     |
| Sat Flow, veh/h              | 1767                                                                              | 3145                                                                              | 1767                                                                              | 3618                                                                              | 0                                                                                 | 0                                                                                 | 3618                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Grp Volume(v), veh/h         | 240                                                                               | 922                                                                               | 77                                                                                | 2064                                                                              | 0                                                                                 | 0                                                                                 | 2209                                                                                | 1183                                                                                |                                                                                     |                                                                                     |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 0                                                                                 | 0                                                                                 | 1763                                                                                | 1572                                                                                |                                                                                     |                                                                                     |
| Q Serve(g_s), s              | 14.2                                                                              | 29.5                                                                              | 5.2                                                                               | 54.4                                                                              | 0.0                                                                               | 0.0                                                                               | 71.5                                                                                | 71.5                                                                                |                                                                                     |                                                                                     |
| Cycle Q Clear(g_c), s        | 14.2                                                                              | 29.5                                                                              | 5.2                                                                               | 54.4                                                                              | 0.0                                                                               | 0.0                                                                               | 71.5                                                                                | 71.5                                                                                |                                                                                     |                                                                                     |
| Prop In Lane                 | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.00                                                                              | 0.00                                                                              |                                                                                     | 1.00                                                                                |                                                                                     |                                                                                     |
| Lane Grp Cap(c), veh/h       | 434                                                                               | 773                                                                               | 81                                                                                | 2394                                                                              | 0                                                                                 | 0                                                                                 | 2101                                                                                | 937                                                                                 |                                                                                     |                                                                                     |
| V/C Ratio(X)                 | 0.55                                                                              | 1.19                                                                              | 0.95                                                                              | 0.86                                                                              | 0.00                                                                              | 0.00                                                                              | 1.05                                                                                | 1.26                                                                                |                                                                                     |                                                                                     |
| Avail Cap(c_a), veh/h        | 434                                                                               | 773                                                                               | 81                                                                                | 2394                                                                              | 0                                                                                 | 0                                                                                 | 2101                                                                                | 937                                                                                 |                                                                                     |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                |                                                                                     |                                                                                     |
| Uniform Delay (d), s/veh     | 39.5                                                                              | 45.3                                                                              | 57.1                                                                              | 14.9                                                                              | 0.0                                                                               | 0.0                                                                               | 24.2                                                                                | 24.2                                                                                |                                                                                     |                                                                                     |
| Incr Delay (d2), s/veh       | 1.5                                                                               | 99.2                                                                              | 83.2                                                                              | 4.4                                                                               | 0.0                                                                               | 0.0                                                                               | 34.9                                                                                | 126.8                                                                               |                                                                                     |                                                                                     |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |
| %ile BackOfQ(50%),veh/ln     | 6.2                                                                               | 21.7                                                                              | 4.2                                                                               | 19.8                                                                              | 0.0                                                                               | 0.0                                                                               | 36.5                                                                                | 56.5                                                                                |                                                                                     |                                                                                     |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 41.0                                                                              | 144.5                                                                             | 140.3                                                                             | 19.3                                                                              | 0.0                                                                               | 0.0                                                                               | 59.1                                                                                | 151.0                                                                               |                                                                                     |                                                                                     |
| LnGrp LOS                    | D                                                                                 | F                                                                                 | F                                                                                 | B                                                                                 | A                                                                                 | A                                                                                 | F                                                                                   | F                                                                                   |                                                                                     |                                                                                     |
| Approach Vol, veh/h          | 1162                                                                              |                                                                                   |                                                                                   | 2141                                                                              |                                                                                   |                                                                                   | 3392                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 123.1                                                                             |                                                                                   |                                                                                   | 23.6                                                                              |                                                                                   |                                                                                   | 91.2                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                 | F                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | F                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 5                                                                                 |                                                                                   | 6                                                                                 |                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 86.0                                                                              |                                                                                   | 10.0                                                                              |                                                                                   | 76.0                                                                              |                                                                                   | 34.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 81.5                                                                              |                                                                                   | 5.5                                                                               |                                                                                   | 71.5                                                                              |                                                                                   | 29.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 56.4                                                                              |                                                                                   | 7.2                                                                               |                                                                                   | 73.5                                                                              |                                                                                   | 31.5                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 18.2                                                                              |                                                                                   | 0.0                                                                               |                                                                                   | 0.0                                                                               |                                                                                   | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 75.1                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 3: 12th Avenue & SR 198 EB Off Ramps

11/11/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |                                                                                   |  |                                                                                   |                                                                                   |                                                                                   |                                                                                     |  |  |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 922                                                                               | 0                                                                                 | 76                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 1033                                                                                | 221                                                                                 | 0                                                                                   | 1386                                                                                | 881                                                                                 |
| Future Volume (veh/h)        | 922                                                                               | 0                                                                                 | 76                                                                                | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 1033                                                                                | 221                                                                                 | 0                                                                                   | 1386                                                                                | 881                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 0                                                                                 | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 991                                                                               | 0                                                                                 | 82                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1111                                                                                | 0                                                                                   | 0                                                                                   | 1490                                                                                | 0                                                                                   |
| Peak Hour Factor             | 0.93                                                                              | 0.93                                                                              | 0.93                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                | 0.93                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 0                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 1122                                                                              | 0                                                                                 | 515                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2001                                                                                |                                                                                     | 0                                                                                   | 2001                                                                                |                                                                                     |
| Arrive On Green              | 0.33                                                                              | 0.00                                                                              | 0.33                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.57                                                                                | 0.00                                                                                | 0.00                                                                                | 0.57                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 991                                                                               | 0                                                                                 | 82                                                                                |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1111                                                                                | 0                                                                                   | 0                                                                                   | 1490                                                                                | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 23.4                                                                              | 0.0                                                                               | 3.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 17.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 27.1                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 23.4                                                                              | 0.0                                                                               | 3.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 17.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 27.1                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                |                                                                                     | 1.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 1122                                                                              | 0                                                                                 | 515                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2001                                                                                |                                                                                     | 0                                                                                   | 2001                                                                                |                                                                                     |
| V/C Ratio(X)                 | 0.88                                                                              | 0.00                                                                              | 0.16                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 0.56                                                                                |                                                                                     | 0.00                                                                                | 0.74                                                                                |                                                                                     |
| Avail Cap(c_a), veh/h        | 1304                                                                              | 0                                                                                 | 598                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                   | 2001                                                                                |                                                                                     | 0                                                                                   | 2001                                                                                |                                                                                     |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 27.2                                                                              | 0.0                                                                               | 20.4                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 11.7                                                                                | 0.0                                                                                 | 0.0                                                                                 | 13.8                                                                                | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 6.7                                                                               | 0.0                                                                               | 0.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 1.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 2.6                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 9.7                                                                               | 0.0                                                                               | 1.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 5.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 9.7                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 33.9                                                                              | 0.0                                                                               | 20.5                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                 | 12.8                                                                                | 0.0                                                                                 | 0.0                                                                                 | 16.4                                                                                | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                   | B                                                                                   |                                                                                     | A                                                                                   | B                                                                                   |                                                                                     |
| Approach Vol, veh/h          | 1073                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1111                                                                                |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 32.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 12.8                                                                                |                                                                                     |                                                                                     | 16.4                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 6                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 53.0                                                                              |                                                                                   |                                                                                   | 32.5                                                                              |                                                                                   |                                                                                   | 53.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 48.5                                                                              |                                                                                   |                                                                                   | 32.5                                                                              |                                                                                   |                                                                                   | 48.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 19.0                                                                              |                                                                                   |                                                                                   | 25.4                                                                              |                                                                                   |                                                                                   | 29.1                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 8.9                                                                               |                                                                                   |                                                                                   | 2.6                                                                               |                                                                                   |                                                                                   | 10.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   | 20.1                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Notes                        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 4: Campus Drive & Lacey Boulevard

11/11/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 46                                                                                | 1144                                                                              | 77                                                                                | 106                                                                               | 1268                                                                              | 66                                                                                | 104                                                                                 | 105                                                                                 | 231                                                                                 | 155                                                                                 | 133                                                                                 | 53                                                                                  |
| Future Volume (veh/h)        | 46                                                                                | 1144                                                                              | 77                                                                                | 106                                                                               | 1268                                                                              | 66                                                                                | 104                                                                                 | 105                                                                                 | 231                                                                                 | 155                                                                                 | 133                                                                                 | 53                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 50                                                                                | 1243                                                                              | 84                                                                                | 115                                                                               | 1378                                                                              | 72                                                                                | 113                                                                                 | 114                                                                                 | 251                                                                                 | 168                                                                                 | 145                                                                                 | 58                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 69                                                                                | 1257                                                                              | 561                                                                               | 129                                                                               | 1375                                                                              | 613                                                                               | 134                                                                                 | 144                                                                                 | 316                                                                                 | 171                                                                                 | 555                                                                                 | 470                                                                                 |
| Arrive On Green              | 0.04                                                                              | 0.36                                                                              | 0.36                                                                              | 0.07                                                                              | 0.39                                                                              | 0.39                                                                              | 0.08                                                                                | 0.28                                                                                | 0.28                                                                                | 0.10                                                                                | 0.30                                                                                | 0.30                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                              | 3526                                                                              | 1572                                                                              | 1767                                                                                | 516                                                                                 | 1135                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 50                                                                                | 1243                                                                              | 84                                                                                | 115                                                                               | 1378                                                                              | 72                                                                                | 113                                                                                 | 0                                                                                   | 365                                                                                 | 168                                                                                 | 145                                                                                 | 58                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                                | 0                                                                                   | 1651                                                                                | 1767                                                                                | 1856                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 2.6                                                                               | 32.2                                                                              | 3.3                                                                               | 5.9                                                                               | 35.9                                                                              | 1.8                                                                               | 5.8                                                                                 | 0.0                                                                                 | 18.8                                                                                | 8.7                                                                                 | 5.5                                                                                 | 2.5                                                                                 |
| Cycle Q Clear(g_c), s        | 2.6                                                                               | 32.2                                                                              | 3.3                                                                               | 5.9                                                                               | 35.9                                                                              | 1.8                                                                               | 5.8                                                                                 | 0.0                                                                                 | 18.8                                                                                | 8.7                                                                                 | 5.5                                                                                 | 2.5                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.69                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 69                                                                                | 1257                                                                              | 561                                                                               | 129                                                                               | 1375                                                                              | 613                                                                               | 134                                                                                 | 0                                                                                   | 459                                                                                 | 171                                                                                 | 555                                                                                 | 470                                                                                 |
| V/C Ratio(X)                 | 0.72                                                                              | 0.99                                                                              | 0.15                                                                              | 0.89                                                                              | 1.00                                                                              | 0.12                                                                              | 0.84                                                                                | 0.00                                                                                | 0.79                                                                                | 0.98                                                                                | 0.26                                                                                | 0.12                                                                                |
| Avail Cap(c_a), veh/h        | 96                                                                                | 1257                                                                              | 561                                                                               | 129                                                                               | 1375                                                                              | 613                                                                               | 134                                                                                 | 0                                                                                   | 459                                                                                 | 171                                                                                 | 555                                                                                 | 470                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 43.7                                                                              | 29.4                                                                              | 20.1                                                                              | 42.3                                                                              | 28.1                                                                              | 8.3                                                                               | 41.9                                                                                | 0.0                                                                                 | 30.8                                                                                | 41.5                                                                                | 24.5                                                                                | 23.5                                                                                |
| Incr Delay (d2), s/veh       | 15.0                                                                              | 22.7                                                                              | 0.1                                                                               | 48.6                                                                              | 24.7                                                                              | 0.1                                                                               | 35.4                                                                                | 0.0                                                                                 | 13.2                                                                                | 63.5                                                                                | 1.1                                                                                 | 0.5                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.4                                                                               | 16.7                                                                              | 1.2                                                                               | 4.3                                                                               | 18.8                                                                              | 0.9                                                                               | 3.8                                                                                 | 0.0                                                                                 | 9.0                                                                                 | 6.8                                                                                 | 2.5                                                                                 | 1.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 58.7                                                                              | 52.1                                                                              | 20.2                                                                              | 90.9                                                                              | 52.8                                                                              | 8.4                                                                               | 77.4                                                                                | 0.0                                                                                 | 44.0                                                                                | 105.0                                                                               | 25.7                                                                                | 24.0                                                                                |
| LnGrp LOS                    | E                                                                                 | D                                                                                 | C                                                                                 | F                                                                                 | F                                                                                 | A                                                                                 | E                                                                                   | A                                                                                   | D                                                                                   | F                                                                                   | C                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 1377                                                                              |                                                                                   |                                                                                   | 1565                                                                              |                                                                                   |                                                                                   | 478                                                                                 |                                                                                     |                                                                                     | 371                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 50.4                                                                              |                                                                                   |                                                                                   | 53.5                                                                              |                                                                                   |                                                                                   | 51.9                                                                                |                                                                                     |                                                                                     | 61.3                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                   |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 13.4                                                                              | 30.1                                                                              | 11.2                                                                              | 37.3                                                                              | 11.5                                                                              | 32.0                                                                              | 8.1                                                                                 | 40.4                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 8.9                                                                               | 25.6                                                                              | 6.7                                                                               | 32.8                                                                              | 7.0                                                                               | 27.5                                                                              | 5.0                                                                                 | 34.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 10.7                                                                              | 20.8                                                                              | 7.9                                                                               | 34.2                                                                              | 7.8                                                                               | 7.5                                                                               | 4.6                                                                                 | 37.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 1.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.9                                                                               | 0.0                                                                                 | 0.0                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 52.9                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 7: 11th Avenue & Lacey Boulevard

11/11/2020

|                              |                                                                                    |                                                                                    |  |  |                                                                                    |  |                                                                                      |                                                                                      |  |  |                                                                                      |  |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                                                                                                                 | EBT                                                                                                                                                                 | EBR                                                                               | WBL                                                                               | WBT                                                                                                                                                                 | WBR                                                                               | NBL                                                                                                                                                                    | NBT                                                                                                                                                                     | NBR                                                                                 | SBL                                                                                 | SBT                                                                                                                                                                     | SBR                                                                                 |
| Lane Configurations          |   |   |  |  |   |                                                                                   |   |   |                                                                                     |  |   |  |
| Traffic Volume (veh/h)       | 391                                                                                                                                                                 | 438                                                                                                                                                                 | 329                                                                               | 170                                                                               | 483                                                                                                                                                                 | 131                                                                               | 473                                                                                                                                                                    | 1025                                                                                                                                                                    | 88                                                                                  | 142                                                                                 | 879                                                                                                                                                                     | 162                                                                                 |
| Future Volume (veh/h)        | 391                                                                                                                                                                 | 438                                                                                                                                                                 | 329                                                                               | 170                                                                               | 483                                                                                                                                                                 | 131                                                                               | 473                                                                                                                                                                    | 1025                                                                                                                                                                    | 88                                                                                  | 142                                                                                 | 879                                                                                                                                                                     | 162                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                                                                                                   | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                                                                                                   | 0                                                                                 | 0                                                                                                                                                                      | 0                                                                                                                                                                       | 0                                                                                   | 0                                                                                   | 0                                                                                                                                                                       | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                                                                                                                |                                                                                                                                                                     | 1.00                                                                              | 1.00                                                                              |                                                                                                                                                                     | 1.00                                                                              | 1.00                                                                                                                                                                   |                                                                                                                                                                         | 1.00                                                                                | 1.00                                                                                |                                                                                                                                                                         | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                                                                                                                | 1.00                                                                                                                                                                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                                                                                                | 1.00                                                                              | 1.00                                                                                                                                                                   | 1.00                                                                                                                                                                    | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Work Zone On Approach        |                                                                                                                                                                     | No                                                                                                                                                                  |                                                                                   |                                                                                   | No                                                                                                                                                                  |                                                                                   |                                                                                                                                                                        | No                                                                                                                                                                      |                                                                                     |                                                                                     | No                                                                                                                                                                      |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                                                                                                                | 1856                                                                                                                                                                | 1856                                                                              | 1856                                                                              | 1856                                                                                                                                                                | 1856                                                                              | 1856                                                                                                                                                                   | 1856                                                                                                                                                                    | 1856                                                                                | 1856                                                                                | 1856                                                                                                                                                                    | 1856                                                                                |
| Adj Flow Rate, veh/h         | 425                                                                                                                                                                 | 476                                                                                                                                                                 | 358                                                                               | 185                                                                               | 525                                                                                                                                                                 | 142                                                                               | 514                                                                                                                                                                    | 1114                                                                                                                                                                    | 96                                                                                  | 154                                                                                 | 955                                                                                                                                                                     | 176                                                                                 |
| Peak Hour Factor             | 0.92                                                                                                                                                                | 0.92                                                                                                                                                                | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                                                                                                | 0.92                                                                              | 0.92                                                                                                                                                                   | 0.92                                                                                                                                                                    | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                                                                                                    | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                                                                                                   | 3                                                                                                                                                                   | 3                                                                                 | 3                                                                                 | 3                                                                                                                                                                   | 3                                                                                 | 3                                                                                                                                                                      | 3                                                                                                                                                                       | 3                                                                                   | 3                                                                                   | 3                                                                                                                                                                       | 3                                                                                   |
| Cap, veh/h                   | 464                                                                                                                                                                 | 847                                                                                                                                                                 | 378                                                                               | 217                                                                               | 626                                                                                                                                                                 | 169                                                                               | 567                                                                                                                                                                    | 1159                                                                                                                                                                    | 100                                                                                 | 182                                                                                 | 1025                                                                                                                                                                    | 457                                                                                 |
| Arrive On Green              | 0.14                                                                                                                                                                | 0.24                                                                                                                                                                | 0.24                                                                              | 0.12                                                                              | 0.23                                                                                                                                                                | 0.23                                                                              | 0.17                                                                                                                                                                   | 0.35                                                                                                                                                                    | 0.35                                                                                | 0.10                                                                                | 0.29                                                                                                                                                                    | 0.29                                                                                |
| Sat Flow, veh/h              | 3428                                                                                                                                                                | 3526                                                                                                                                                                | 1572                                                                              | 1767                                                                              | 2746                                                                                                                                                                | 739                                                                               | 3428                                                                                                                                                                   | 3285                                                                                                                                                                    | 283                                                                                 | 1767                                                                                | 3526                                                                                                                                                                    | 1572                                                                                |
| Grp Volume(v), veh/h         | 425                                                                                                                                                                 | 476                                                                                                                                                                 | 358                                                                               | 185                                                                               | 336                                                                                                                                                                 | 331                                                                               | 514                                                                                                                                                                    | 597                                                                                                                                                                     | 613                                                                                 | 154                                                                                 | 955                                                                                                                                                                     | 176                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                                                                                                                | 1763                                                                                                                                                                | 1572                                                                              | 1767                                                                              | 1763                                                                                                                                                                | 1722                                                                              | 1714                                                                                                                                                                   | 1763                                                                                                                                                                    | 1805                                                                                | 1767                                                                                | 1763                                                                                                                                                                    | 1572                                                                                |
| Q Serve(g_s), s              | 12.2                                                                                                                                                                | 11.8                                                                                                                                                                | 14.8                                                                              | 10.2                                                                              | 18.1                                                                                                                                                                | 18.3                                                                              | 14.7                                                                                                                                                                   | 33.1                                                                                                                                                                    | 33.2                                                                                | 8.5                                                                                 | 26.3                                                                                                                                                                    | 8.9                                                                                 |
| Cycle Q Clear(g_c), s        | 12.2                                                                                                                                                                | 11.8                                                                                                                                                                | 14.8                                                                              | 10.2                                                                              | 18.1                                                                                                                                                                | 18.3                                                                              | 14.7                                                                                                                                                                   | 33.1                                                                                                                                                                    | 33.2                                                                                | 8.5                                                                                 | 26.3                                                                                                                                                                    | 8.9                                                                                 |
| Prop In Lane                 | 1.00                                                                                                                                                                |                                                                                                                                                                     | 1.00                                                                              | 1.00                                                                              |                                                                                                                                                                     | 0.43                                                                              | 1.00                                                                                                                                                                   |                                                                                                                                                                         | 0.16                                                                                | 1.00                                                                                |                                                                                                                                                                         | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 464                                                                                                                                                                 | 847                                                                                                                                                                 | 378                                                                               | 217                                                                               | 402                                                                                                                                                                 | 393                                                                               | 567                                                                                                                                                                    | 622                                                                                                                                                                     | 637                                                                                 | 182                                                                                 | 1025                                                                                                                                                                    | 457                                                                                 |
| V/C Ratio(X)                 | 0.92                                                                                                                                                                | 0.56                                                                                                                                                                | 0.95                                                                              | 0.85                                                                              | 0.84                                                                                                                                                                | 0.84                                                                              | 0.91                                                                                                                                                                   | 0.96                                                                                                                                                                    | 0.96                                                                                | 0.84                                                                                | 0.93                                                                                                                                                                    | 0.38                                                                                |
| Avail Cap(c_a), veh/h        | 464                                                                                                                                                                 | 944                                                                                                                                                                 | 421                                                                               | 262                                                                               | 495                                                                                                                                                                 | 484                                                                               | 567                                                                                                                                                                    | 622                                                                                                                                                                     | 637                                                                                 | 182                                                                                 | 1025                                                                                                                                                                    | 457                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                                                                                                                | 1.00                                                                                                                                                                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                                                                                                | 1.00                                                                              | 1.00                                                                                                                                                                   | 1.00                                                                                                                                                                    | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                                                                                                                | 1.00                                                                                                                                                                | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                                                                                                | 1.00                                                                              | 1.00                                                                                                                                                                   | 1.00                                                                                                                                                                    | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                                                                                                    | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 42.6                                                                                                                                                                | 33.3                                                                                                                                                                | 16.4                                                                              | 42.8                                                                              | 36.7                                                                                                                                                                | 36.8                                                                              | 40.9                                                                                                                                                                   | 31.6                                                                                                                                                                    | 31.6                                                                                | 43.9                                                                                | 34.4                                                                                                                                                                    | 28.3                                                                                |
| Incr Delay (d2), s/veh       | 22.9                                                                                                                                                                | 0.6                                                                                                                                                                 | 29.3                                                                              | 19.7                                                                              | 10.0                                                                                                                                                                | 10.7                                                                              | 18.3                                                                                                                                                                   | 27.6                                                                                                                                                                    | 27.4                                                                                | 28.6                                                                                | 15.8                                                                                                                                                                    | 2.4                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                                                                                                                 | 0.0                                                                                                                                                                 | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                                                                                                 | 0.0                                                                               | 0.0                                                                                                                                                                    | 0.0                                                                                                                                                                     | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                                                                                                     | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 6.5                                                                                                                                                                 | 5.0                                                                                                                                                                 | 8.1                                                                               | 5.6                                                                               | 8.7                                                                                                                                                                 | 8.7                                                                               | 7.5                                                                                                                                                                    | 18.2                                                                                                                                                                    | 18.6                                                                                | 5.1                                                                                 | 13.1                                                                                                                                                                    | 3.6                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                        |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| LnGrp Delay(d),s/veh         | 65.4                                                                                                                                                                | 33.9                                                                                                                                                                | 45.7                                                                              | 62.5                                                                              | 46.7                                                                                                                                                                | 47.5                                                                              | 59.1                                                                                                                                                                   | 59.1                                                                                                                                                                    | 59.1                                                                                | 72.6                                                                                | 50.2                                                                                                                                                                    | 30.7                                                                                |
| LnGrp LOS                    | E                                                                                                                                                                   | C                                                                                                                                                                   | D                                                                                 | E                                                                                 | D                                                                                                                                                                   | D                                                                                 | E                                                                                                                                                                      | E                                                                                                                                                                       | E                                                                                   | E                                                                                   | D                                                                                                                                                                       | C                                                                                   |
| Approach Vol, veh/h          |                                                                                                                                                                     | 1259                                                                                                                                                                |                                                                                   |                                                                                   | 852                                                                                                                                                                 |                                                                                   |                                                                                                                                                                        | 1724                                                                                                                                                                    |                                                                                     |                                                                                     | 1285                                                                                                                                                                    |                                                                                     |
| Approach Delay, s/veh        |                                                                                                                                                                     | 47.9                                                                                                                                                                |                                                                                   |                                                                                   | 50.5                                                                                                                                                                |                                                                                   |                                                                                                                                                                        | 59.1                                                                                                                                                                    |                                                                                     |                                                                                     | 50.2                                                                                                                                                                    |                                                                                     |
| Approach LOS                 |                                                                                                                                                                     | D                                                                                                                                                                   |                                                                                   |                                                                                   | D                                                                                                                                                                   |                                                                                   |                                                                                                                                                                        | E                                                                                                                                                                       |                                                                                     |                                                                                     | D                                                                                                                                                                       |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                                                                                                   | 2                                                                                                                                                                   | 3                                                                                 | 4                                                                                 | 5                                                                                                                                                                   | 6                                                                                 | 7                                                                                                                                                                      | 8                                                                                                                                                                       |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 14.8                                                                                                                                                                | 39.7                                                                                                                                                                | 16.8                                                                              | 28.5                                                                              | 21.0                                                                                                                                                                | 33.5                                                                              | 18.0                                                                                                                                                                   | 27.2                                                                                                                                                                    |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                                                                                                                 | 4.5                                                                                                                                                                 | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                                                                                                 | 4.5                                                                               | 4.5                                                                                                                                                                    | 4.5                                                                                                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Max Green Setting (Gmax), s  | 10.3                                                                                                                                                                | 35.2                                                                                                                                                                | 14.8                                                                              | 26.7                                                                              | 16.5                                                                                                                                                                | 29.0                                                                              | 13.5                                                                                                                                                                   | 28.0                                                                                                                                                                    |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 10.5                                                                                                                                                                | 35.2                                                                                                                                                                | 12.2                                                                              | 16.8                                                                              | 16.7                                                                                                                                                                | 28.3                                                                              | 14.2                                                                                                                                                                   | 20.3                                                                                                                                                                    |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                                                                                                                 | 0.0                                                                                                                                                                 | 0.1                                                                               | 3.2                                                                               | 0.0                                                                                                                                                                 | 0.5                                                                               | 0.0                                                                                                                                                                    | 2.4                                                                                                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                                                                                                     |                                                                                                                                                                     |                                                                                   |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                        |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                                                                                                     |                                                                                                                                                                     | 52.7                                                                              |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                        |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |
| HCM 6th LOS                  |                                                                                                                                                                     |                                                                                                                                                                     | D                                                                                 |                                                                                   |                                                                                                                                                                     |                                                                                   |                                                                                                                                                                        |                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                                                                                                         |                                                                                     |



# HCM 6th Signalized Intersection Summary 8: 11th Avenue & 7th Street

11/11/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |  |  |  |  |  |  |
| Traffic Volume (veh/h)       | 104                                                                               | 296                                                                               | 339                                                                               | 252                                                                               | 263                                                                               | 169                                                                               | 258                                                                                 | 950                                                                                 | 178                                                                                 | 172                                                                                 | 879                                                                                 | 80                                                                                  |
| Future Volume (veh/h)        | 104                                                                               | 296                                                                               | 339                                                                               | 252                                                                               | 263                                                                               | 169                                                                               | 258                                                                                 | 950                                                                                 | 178                                                                                 | 172                                                                                 | 879                                                                                 | 80                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 113                                                                               | 322                                                                               | 368                                                                               | 274                                                                               | 286                                                                               | 184                                                                               | 280                                                                                 | 1033                                                                                | 193                                                                                 | 187                                                                                 | 955                                                                                 | 87                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 169                                                                               | 417                                                                               | 372                                                                               | 281                                                                               | 721                                                                               | 450                                                                               | 284                                                                                 | 1147                                                                                | 512                                                                                 | 204                                                                                 | 987                                                                                 | 440                                                                                 |
| Arrive On Green              | 0.05                                                                              | 0.24                                                                              | 0.24                                                                              | 0.16                                                                              | 0.35                                                                              | 0.35                                                                              | 0.16                                                                                | 0.33                                                                                | 0.33                                                                                | 0.12                                                                                | 0.28                                                                                | 0.28                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 2082                                                                              | 1302                                                                              | 1767                                                                                | 3526                                                                                | 1572                                                                                | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 113                                                                               | 322                                                                               | 368                                                                               | 274                                                                               | 241                                                                               | 229                                                                               | 280                                                                                 | 1033                                                                                | 193                                                                                 | 187                                                                                 | 955                                                                                 | 87                                                                                  |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 1763                                                                              | 1572                                                                              | 1767                                                                              | 1763                                                                              | 1621                                                                              | 1767                                                                                | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 3.6                                                                               | 18.8                                                                              | 25.7                                                                              | 17.0                                                                              | 11.4                                                                              | 11.8                                                                              | 17.4                                                                                | 30.8                                                                                | 6.7                                                                                 | 11.5                                                                                | 29.4                                                                                | 4.6                                                                                 |
| Cycle Q Clear(g_c), s        | 3.6                                                                               | 18.8                                                                              | 25.7                                                                              | 17.0                                                                              | 11.4                                                                              | 11.8                                                                              | 17.4                                                                                | 30.8                                                                                | 6.7                                                                                 | 11.5                                                                                | 29.4                                                                                | 4.6                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 0.80                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 169                                                                               | 417                                                                               | 372                                                                               | 281                                                                               | 610                                                                               | 561                                                                               | 284                                                                                 | 1147                                                                                | 512                                                                                 | 204                                                                                 | 987                                                                                 | 440                                                                                 |
| V/C Ratio(X)                 | 0.67                                                                              | 0.77                                                                              | 0.99                                                                              | 0.97                                                                              | 0.39                                                                              | 0.41                                                                              | 0.98                                                                                | 0.90                                                                                | 0.38                                                                                | 0.92                                                                                | 0.97                                                                                | 0.20                                                                                |
| Avail Cap(c_a), veh/h        | 234                                                                               | 417                                                                               | 372                                                                               | 281                                                                               | 610                                                                               | 561                                                                               | 284                                                                                 | 1147                                                                                | 512                                                                                 | 204                                                                                 | 987                                                                                 | 440                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 51.4                                                                              | 39.2                                                                              | 41.9                                                                              | 46.0                                                                              | 27.2                                                                              | 27.4                                                                              | 46.0                                                                                | 35.4                                                                                | 11.8                                                                                | 48.1                                                                                | 39.1                                                                                | 30.2                                                                                |
| Incr Delay (d2), s/veh       | 4.5                                                                               | 8.7                                                                               | 43.9                                                                              | 46.5                                                                              | 0.4                                                                               | 0.5                                                                               | 49.0                                                                                | 11.3                                                                                | 2.1                                                                                 | 40.5                                                                                | 21.8                                                                                | 1.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.6                                                                               | 9.0                                                                               | 14.2                                                                              | 11.1                                                                              | 4.9                                                                               | 4.7                                                                               | 11.4                                                                                | 14.6                                                                                | 2.6                                                                                 | 7.3                                                                                 | 15.3                                                                                | 1.9                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 55.9                                                                              | 48.0                                                                              | 85.8                                                                              | 92.5                                                                              | 27.7                                                                              | 27.9                                                                              | 95.0                                                                                | 46.7                                                                                | 13.9                                                                                | 88.6                                                                                | 60.9                                                                                | 31.2                                                                                |
| LnGrp LOS                    | E                                                                                 | D                                                                                 | F                                                                                 | F                                                                                 | C                                                                                 | C                                                                                 | F                                                                                   | D                                                                                   | B                                                                                   | F                                                                                   | E                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 803                                                                               |                                                                                   |                                                                                   | 744                                                                               |                                                                                   |                                                                                   | 1506                                                                                |                                                                                     |                                                                                     | 1229                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 66.4                                                                              |                                                                                   |                                                                                   | 51.6                                                                              |                                                                                   |                                                                                   | 51.5                                                                                |                                                                                     |                                                                                     | 63.0                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | E                                                                                 |                                                                                   |                                                                                   | D                                                                                 |                                                                                   |                                                                                   | D                                                                                   |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 17.2                                                                              | 40.3                                                                              | 22.0                                                                              | 30.5                                                                              | 22.2                                                                              | 35.3                                                                              | 9.9                                                                                 | 42.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 12.7                                                                              | 35.8                                                                              | 17.5                                                                              | 26.0                                                                              | 17.7                                                                              | 30.8                                                                              | 7.5                                                                                 | 36.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 13.5                                                                              | 32.8                                                                              | 19.0                                                                              | 27.7                                                                              | 19.4                                                                              | 31.4                                                                              | 5.6                                                                                 | 13.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 2.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.1                                                                                 | 3.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 57.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 10: 11th Avenue & 5th Street

11/11/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |  |                                                                                   |  |  |                                                                                     |  |  |  |
| Traffic Volume (veh/h)       | 262                                                                               | 0                                                                                 | 211                                                                               | 15                                                                                | 0                                                                                 | 15                                                                                | 327                                                                                 | 1656                                                                                | 5                                                                                   | 12                                                                                  | 1566                                                                                | 215                                                                                 |
| Future Volume (veh/h)        | 262                                                                               | 0                                                                                 | 211                                                                               | 15                                                                                | 0                                                                                 | 15                                                                                | 327                                                                                 | 1656                                                                                | 5                                                                                   | 12                                                                                  | 1566                                                                                | 215                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 270                                                                               | 0                                                                                 | 218                                                                               | 15                                                                                | 0                                                                                 | 15                                                                                | 337                                                                                 | 1707                                                                                | 5                                                                                   | 12                                                                                  | 1614                                                                                | 222                                                                                 |
| Peak Hour Factor             | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                              | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                | 0.97                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 345                                                                               | 0                                                                                 | 372                                                                               | 125                                                                               | 15                                                                                | 91                                                                                | 339                                                                                 | 2261                                                                                | 7                                                                                   | 25                                                                                  | 1583                                                                                | 706                                                                                 |
| Arrive On Green              | 0.24                                                                              | 0.00                                                                              | 0.24                                                                              | 0.24                                                                              | 0.00                                                                              | 0.24                                                                              | 0.19                                                                                | 0.63                                                                                | 0.63                                                                                | 0.01                                                                                | 0.45                                                                                | 0.45                                                                                |
| Sat Flow, veh/h              | 1387                                                                              | 0                                                                                 | 1572                                                                              | 319                                                                               | 65                                                                                | 385                                                                               | 1767                                                                                | 3606                                                                                | 11                                                                                  | 1767                                                                                | 3526                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         | 270                                                                               | 0                                                                                 | 218                                                                               | 30                                                                                | 0                                                                                 | 0                                                                                 | 337                                                                                 | 834                                                                                 | 878                                                                                 | 12                                                                                  | 1614                                                                                | 222                                                                                 |
| Grp Sat Flow(s),veh/h/ln     | 1387                                                                              | 0                                                                                 | 1572                                                                              | 770                                                                               | 0                                                                                 | 0                                                                                 | 1767                                                                                | 1763                                                                                | 1854                                                                                | 1767                                                                                | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              | 11.3                                                                              | 0.0                                                                               | 13.5                                                                              | 0.3                                                                               | 0.0                                                                               | 0.0                                                                               | 20.9                                                                                | 36.9                                                                                | 36.9                                                                                | 0.7                                                                                 | 49.4                                                                                | 10.0                                                                                |
| Cycle Q Clear(g_c), s        | 25.1                                                                              | 0.0                                                                               | 13.5                                                                              | 13.8                                                                              | 0.0                                                                               | 0.0                                                                               | 20.9                                                                                | 36.9                                                                                | 36.9                                                                                | 0.7                                                                                 | 49.4                                                                                | 10.0                                                                                |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 1.00                                                                              | 0.50                                                                              |                                                                                   | 0.50                                                                              | 1.00                                                                                |                                                                                     | 0.01                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       | 345                                                                               | 0                                                                                 | 372                                                                               | 231                                                                               | 0                                                                                 | 0                                                                                 | 339                                                                                 | 1105                                                                                | 1162                                                                                | 25                                                                                  | 1583                                                                                | 706                                                                                 |
| V/C Ratio(X)                 | 0.78                                                                              | 0.00                                                                              | 0.59                                                                              | 0.13                                                                              | 0.00                                                                              | 0.00                                                                              | 0.99                                                                                | 0.75                                                                                | 0.76                                                                                | 0.49                                                                                | 1.02                                                                                | 0.31                                                                                |
| Avail Cap(c_a), veh/h        | 345                                                                               | 0                                                                                 | 372                                                                               | 231                                                                               | 0                                                                                 | 0                                                                                 | 339                                                                                 | 1105                                                                                | 1162                                                                                | 80                                                                                  | 1583                                                                                | 706                                                                                 |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 0.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     | 42.7                                                                              | 0.0                                                                               | 37.2                                                                              | 33.3                                                                              | 0.0                                                                               | 0.0                                                                               | 44.4                                                                                | 14.5                                                                                | 14.5                                                                                | 53.8                                                                                | 30.3                                                                                | 19.4                                                                                |
| Incr Delay (d2), s/veh       | 11.2                                                                              | 0.0                                                                               | 2.4                                                                               | 0.3                                                                               | 0.0                                                                               | 0.0                                                                               | 47.2                                                                                | 4.8                                                                                 | 4.6                                                                                 | 14.1                                                                                | 27.6                                                                                | 1.2                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 8.3                                                                               | 0.0                                                                               | 5.4                                                                               | 0.6                                                                               | 0.0                                                                               | 0.0                                                                               | 13.5                                                                                | 15.0                                                                                | 15.7                                                                                | 0.4                                                                                 | 26.1                                                                                | 3.8                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 53.9                                                                              | 0.0                                                                               | 39.6                                                                              | 33.5                                                                              | 0.0                                                                               | 0.0                                                                               | 91.6                                                                                | 19.3                                                                                | 19.1                                                                                | 67.9                                                                                | 57.9                                                                                | 20.6                                                                                |
| LnGrp LOS                    | D                                                                                 | A                                                                                 | D                                                                                 | C                                                                                 | A                                                                                 | A                                                                                 | F                                                                                   | B                                                                                   | B                                                                                   | E                                                                                   | F                                                                                   | C                                                                                   |
| Approach Vol, veh/h          | 488                                                                               |                                                                                   |                                                                                   | 30                                                                                |                                                                                   |                                                                                   | 2049                                                                                |                                                                                     |                                                                                     | 1848                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 47.5                                                                              |                                                                                   |                                                                                   | 33.5                                                                              |                                                                                   |                                                                                   | 31.1                                                                                |                                                                                     |                                                                                     | 53.5                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | D                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | C                                                                                   |                                                                                     |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 5                                                                                 | 6                                                                                 | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 6.0                                                                               | 73.5                                                                              | 30.5                                                                              |                                                                                   | 25.6                                                                              | 53.9                                                                              | 30.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 5.0                                                                               | 65.5                                                                              | 26.0                                                                              |                                                                                   | 21.1                                                                              | 49.4                                                                              | 26.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 2.7                                                                               | 38.9                                                                              | 27.1                                                                              |                                                                                   | 22.9                                                                              | 51.4                                                                              | 15.8                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 15.6                                                                              | 0.0                                                                               |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.1                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 42.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary

## 11: 11th Avenue & SR 198 WB On Ramp/4th Street

11/11/2020

|                              |  |  |  |  |  |  |   |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |                                                                                   |                                                                                   |  |  |  |  |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 0                                                                                 | 0                                                                                 | 0                                                                                 | 337                                                                               | 54                                                                                | 368                                                                               | 141                                                                                 | 1608                                                                                | 0                                                                                   | 0                                                                                   | 1496                                                                                | 428                                                                                 |
| Future Volume (veh/h)        | 0                                                                                 | 0                                                                                 | 0                                                                                 | 337                                                                               | 54                                                                                | 368                                                                               | 141                                                                                 | 1608                                                                                | 0                                                                                   | 0                                                                                   | 1496                                                                                | 428                                                                                 |
| Initial Q (Qb), veh          |                                                                                   |                                                                                   |                                                                                   | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        |                                                                                   |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |
| Adj Sat Flow, veh/h/ln       |                                                                                   |                                                                                   |                                                                                   | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 0                                                                                   | 0                                                                                   | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         |                                                                                   |                                                                                   |                                                                                   | 355                                                                               | 57                                                                                | 387                                                                               | 148                                                                                 | 1693                                                                                | 0                                                                                   | 0                                                                                   | 1575                                                                                | 451                                                                                 |
| Peak Hour Factor             |                                                                                   |                                                                                   |                                                                                   | 0.95                                                                              | 0.95                                                                              | 0.95                                                                              | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                | 0.95                                                                                |
| Percent Heavy Veh, %         |                                                                                   |                                                                                   |                                                                                   | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 0                                                                                   | 0                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   |                                                                                   |                                                                                   |                                                                                   | 498                                                                               | 523                                                                               | 443                                                                               | 165                                                                                 | 2153                                                                                | 0                                                                                   | 0                                                                                   | 1634                                                                                | 729                                                                                 |
| Arrive On Green              |                                                                                   |                                                                                   |                                                                                   | 0.28                                                                              | 0.28                                                                              | 0.28                                                                              | 0.09                                                                                | 0.61                                                                                | 0.00                                                                                | 0.00                                                                                | 0.46                                                                                | 0.46                                                                                |
| Sat Flow, veh/h              |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 3618                                                                                | 0                                                                                   | 0                                                                                   | 3618                                                                                | 1572                                                                                |
| Grp Volume(v), veh/h         |                                                                                   |                                                                                   |                                                                                   | 355                                                                               | 57                                                                                | 387                                                                               | 148                                                                                 | 1693                                                                                | 0                                                                                   | 0                                                                                   | 1575                                                                                | 451                                                                                 |
| Grp Sat Flow(s),veh/h/ln     |                                                                                   |                                                                                   |                                                                                   | 1767                                                                              | 1856                                                                              | 1572                                                                              | 1767                                                                                | 1763                                                                                | 0                                                                                   | 0                                                                                   | 1763                                                                                | 1572                                                                                |
| Q Serve(g_s), s              |                                                                                   |                                                                                   |                                                                                   | 15.1                                                                              | 1.9                                                                               | 19.6                                                                              | 6.9                                                                                 | 30.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 36.2                                                                                | 18.0                                                                                |
| Cycle Q Clear(g_c), s        |                                                                                   |                                                                                   |                                                                                   | 15.1                                                                              | 1.9                                                                               | 19.6                                                                              | 6.9                                                                                 | 30.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 36.2                                                                                | 18.0                                                                                |
| Prop In Lane                 |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 0.00                                                                                | 0.00                                                                                |                                                                                     | 1.00                                                                                |
| Lane Grp Cap(c), veh/h       |                                                                                   |                                                                                   |                                                                                   | 498                                                                               | 523                                                                               | 443                                                                               | 165                                                                                 | 2153                                                                                | 0                                                                                   | 0                                                                                   | 1634                                                                                | 729                                                                                 |
| V/C Ratio(X)                 |                                                                                   |                                                                                   |                                                                                   | 0.71                                                                              | 0.11                                                                              | 0.87                                                                              | 0.90                                                                                | 0.79                                                                                | 0.00                                                                                | 0.00                                                                                | 0.96                                                                                | 0.62                                                                                |
| Avail Cap(c_a), veh/h        |                                                                                   |                                                                                   |                                                                                   | 635                                                                               | 666                                                                               | 565                                                                               | 165                                                                                 | 2153                                                                                | 0                                                                                   | 0                                                                                   | 1634                                                                                | 729                                                                                 |
| HCM Platoon Ratio            |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Uniform Delay (d), s/veh     |                                                                                   |                                                                                   |                                                                                   | 27.0                                                                              | 22.2                                                                              | 28.6                                                                              | 37.5                                                                                | 12.2                                                                                | 0.0                                                                                 | 0.0                                                                                 | 21.7                                                                                | 16.9                                                                                |
| Incr Delay (d2), s/veh       |                                                                                   |                                                                                   |                                                                                   | 2.7                                                                               | 0.1                                                                               | 11.8                                                                              | 41.8                                                                                | 3.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 15.2                                                                                | 3.9                                                                                 |
| Initial Q Delay(d3),s/veh    |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     |                                                                                   |                                                                                   |                                                                                   | 6.2                                                                               | 0.8                                                                               | 8.2                                                                               | 4.8                                                                                 | 10.9                                                                                | 0.0                                                                                 | 0.0                                                                                 | 16.8                                                                                | 6.7                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         |                                                                                   |                                                                                   |                                                                                   | 29.7                                                                              | 22.3                                                                              | 40.4                                                                              | 79.3                                                                                | 15.2                                                                                | 0.0                                                                                 | 0.0                                                                                 | 37.0                                                                                | 20.8                                                                                |
| LnGrp LOS                    |                                                                                   |                                                                                   |                                                                                   | C                                                                                 | C                                                                                 | D                                                                                 | E                                                                                   | B                                                                                   | A                                                                                   | A                                                                                   | D                                                                                   | C                                                                                   |
| Approach Vol, veh/h          |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 799                                                                               |                                                                                   |                                                                                     | 1841                                                                                |                                                                                     |                                                                                     | 2026                                                                                |                                                                                     |
| Approach Delay, s/veh        |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 34.3                                                                              |                                                                                   |                                                                                     | 20.3                                                                                |                                                                                     |                                                                                     | 33.4                                                                                |                                                                                     |
| Approach LOS                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |
| Timer - Assigned Phs         |                                                                                   | 2                                                                                 |                                                                                   |                                                                                   | 5                                                                                 | 6                                                                                 |                                                                                     | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     |                                                                                   | 55.5                                                                              |                                                                                   |                                                                                   | 12.3                                                                              | 43.2                                                                              |                                                                                     | 28.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                     | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  |                                                                                   | 51.0                                                                              |                                                                                   |                                                                                   | 7.8                                                                               | 38.7                                                                              |                                                                                     | 30.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s |                                                                                   | 32.0                                                                              |                                                                                   |                                                                                   | 8.9                                                                               | 38.2                                                                              |                                                                                     | 21.6                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      |                                                                                   | 12.8                                                                              |                                                                                   |                                                                                   | 0.0                                                                               | 0.5                                                                               |                                                                                     | 1.9                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| <b>Intersection Summary</b>  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           |                                                                                   |                                                                                   |                                                                                   | 28.4                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  |                                                                                   |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/11/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |                                                                                   |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |                                                                                     |
| Traffic Volume (veh/h)       | 570                                                                               | 122                                                                               | 116                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 1180                                                                                | 314                                                                                 | 556                                                                                 | 1284                                                                                | 0                                                                                   |
| Future Volume (veh/h)        | 570                                                                               | 122                                                                               | 116                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 1180                                                                                | 314                                                                                 | 556                                                                                 | 1284                                                                                | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 594                                                                               | 127                                                                               | 121                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1229                                                                                | 327                                                                                 | 579                                                                                 | 1338                                                                                | 0                                                                                   |
| Peak Hour Factor             | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.96                                                                               | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 496                                                                               | 106                                                                               | 531                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1043                                                                                | 465                                                                                 | 449                                                                                 | 2071                                                                                | 0                                                                                   |
| Arrive On Green              | 0.34                                                                              | 0.34                                                                              | 0.34                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.30                                                                                | 0.30                                                                                | 0.25                                                                                | 0.59                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 1468                                                                              | 314                                                                               | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 721                                                                               | 0                                                                                 | 121                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1229                                                                                | 327                                                                                 | 579                                                                                 | 1338                                                                                | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1782                                                                              | 0                                                                                 | 1572                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 40.5                                                                              | 0.0                                                                               | 6.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 35.5                                                                                | 22.2                                                                                | 30.5                                                                                | 30.3                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 40.5                                                                              | 0.0                                                                               | 6.6                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 35.5                                                                                | 22.2                                                                                | 30.5                                                                                | 30.3                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 0.82                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 601                                                                               | 0                                                                                 | 531                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1043                                                                                | 465                                                                                 | 449                                                                                 | 2071                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 1.20                                                                              | 0.00                                                                              | 0.23                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.18                                                                                | 0.70                                                                                | 1.29                                                                                | 0.65                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 601                                                                               | 0                                                                                 | 531                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1043                                                                                | 465                                                                                 | 449                                                                                 | 2071                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 39.8                                                                              | 0.0                                                                               | 28.5                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 42.3                                                                                | 37.6                                                                                | 44.7                                                                                | 16.5                                                                                | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 104.8                                                                             | 0.0                                                                               | 0.2                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 90.4                                                                                | 8.6                                                                                 | 146.0                                                                               | 1.6                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 34.3                                                                              | 0.0                                                                               | 2.5                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 28.0                                                                                | 9.4                                                                                 | 31.4                                                                                | 12.2                                                                                | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 144.6                                                                             | 0.0                                                                               | 28.7                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 132.6                                                                               | 46.2                                                                                | 190.8                                                                               | 18.0                                                                                | 0.0                                                                                 |
| LnGrp LOS                    | F                                                                                 | A                                                                                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | F                                                                                   | D                                                                                   | F                                                                                   | B                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 842                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1556                                                                               |                                                                                     |                                                                                     | 1917                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 127.9                                                                             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 114.5                                                                              |                                                                                     |                                                                                     | 70.2                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | F                                                                                  |                                                                                     |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 35.0                                                                              | 40.0                                                                              | 45.0                                                                              |                                                                                   | 75.0                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 30.5                                                                              | 35.5                                                                              | 40.5                                                                              |                                                                                   | 70.5                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 32.5                                                                              | 37.5                                                                              | 42.5                                                                              |                                                                                   | 32.3                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   | 13.8                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 97.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | F                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

HCM 6th AWSC  
5: Campus Dr/Campus Drive & 7th Street

11/02/2020

| Intersection              |       |
|---------------------------|-------|
| Intersection Delay, s/veh | 146.9 |
| Intersection LOS          | F     |

| Movement            | EBL                                                                               | EBT                                                                               | EBR  | WBL                                                                               | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |  |  |      |  |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 108                                                                               | 410                                                                               | 53   | 27                                                                                | 521                                                                               | 62   | 83   | 169                                                                                 | 30   | 136  | 97                                                                                  | 135  |
| Future Vol, veh/h   | 108                                                                               | 410                                                                               | 53   | 27                                                                                | 521                                                                               | 62   | 83   | 169                                                                                 | 30   | 136  | 97                                                                                  | 135  |
| Peak Hour Factor    | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96                                                                              | 0.96                                                                              | 0.96 | 0.96 | 0.96                                                                                | 0.96 | 0.96 | 0.96                                                                                | 0.96 |
| Heavy Vehicles, %   | 3                                                                                 | 3                                                                                 | 3    | 3                                                                                 | 3                                                                                 | 3    | 3    | 3                                                                                   | 3    | 3    | 3                                                                                   | 3    |
| Mvmt Flow           | 113                                                                               | 427                                                                               | 55   | 28                                                                                | 543                                                                               | 65   | 86   | 176                                                                                 | 31   | 142  | 101                                                                                 | 141  |
| Number of Lanes     | 1                                                                                 | 1                                                                                 | 0    | 1                                                                                 | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB    | WB    | NB | SB   |
|----------------------------|-------|-------|----|------|
| Opposing Approach          | WB    | EB    | SB | NB   |
| Opposing Lanes             | 2     | 2     | 1  | 1    |
| Conflicting Approach Left  | SB    | NB    | EB | WB   |
| Conflicting Lanes Left     | 1     | 1     | 2  | 2    |
| Conflicting Approach Right | NB    | SB    | WB | EB   |
| Conflicting Lanes Right    | 1     | 1     | 2  | 2    |
| HCM Control Delay          | 123.6 | 263.1 | 44 | 69.1 |
| HCM LOS                    | F     | F     | E  | F    |

| Lane                   | NBLn1 | EBLn1 | EBLn2  | WBLn1  | WBLn2 | SBLn1 |
|------------------------|-------|-------|--------|--------|-------|-------|
| Vol Left, %            | 29%   | 100%  | 0%     | 100%   | 0%    | 37%   |
| Vol Thru, %            | 60%   | 0%    | 89%    | 0%     | 89%   | 26%   |
| Vol Right, %           | 11%   | 0%    | 11%    | 0%     | 11%   | 37%   |
| Sign Control           | Stop  | Stop  | Stop   | Stop   | Stop  | Stop  |
| Traffic Vol by Lane    | 282   | 108   | 463    | 27     | 583   | 368   |
| LT Vol                 | 83    | 108   | 0      | 27     | 0     | 136   |
| Through Vol            | 169   | 0     | 410    | 0      | 521   | 97    |
| RT Vol                 | 30    | 0     | 53     | 0      | 62    | 135   |
| Lane Flow Rate         | 294   | 112   | 482    | 28     | 607   | 383   |
| Geometry Grp           | 2     | 7     | 7      | 7      | 7     | 2     |
| Degree of Util (X)     | 0.77  | 0.3   | 1.209  | 0.075  | 1.527 | 0.943 |
| Departure Headway (Hd) | 11.38 | 10.86 | 10.246 | 10.213 | 9.609 | 10.6  |
| Convergence, Y/N       | Yes   | Yes   | Yes    | Yes    | Yes   | Yes   |
| Cap                    | 320   | 333   | 357    | 353    | 383   | 345   |
| Service Time           | 9.38  | 8.56  | 7.946  | 7.913  | 7.309 | 8.6   |
| HCM Lane V/C Ratio     | 0.919 | 0.336 | 1.35   | 0.079  | 1.585 | 1.11  |
| HCM Control Delay      | 44    | 18.1  | 148.2  | 13.7   | 274.6 | 69.1  |
| HCM Lane LOS           | E     | C     | F      | B      | F     | F     |
| HCM 95th-tile Q        | 6     | 1.2   | 18     | 0.2    | 31.5  | 9.8   |

# TRANSPORTATION IMPROVEMENT WORKSHEETS



# HCM 6th Signalized Intersection Summary

## 5: Campus Dr/Campus Drive & 7th Street

11/11/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 127                                                                               | 181                                                                               | 48                                                                                | 51                                                                                | 223                                                                               | 48                                                                                | 43                                                                                  | 122                                                                                 | 30                                                                                  | 34                                                                                  | 140                                                                                 | 51                                                                                  |
| Future Volume (veh/h)        | 127                                                                               | 181                                                                               | 48                                                                                | 51                                                                                | 223                                                                               | 48                                                                                | 43                                                                                  | 122                                                                                 | 30                                                                                  | 34                                                                                  | 140                                                                                 | 51                                                                                  |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                  |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 138                                                                               | 197                                                                               | 52                                                                                | 55                                                                                | 242                                                                               | 52                                                                                | 47                                                                                  | 133                                                                                 | 33                                                                                  | 37                                                                                  | 152                                                                                 | 55                                                                                  |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 192                                                                               | 429                                                                               | 113                                                                               | 106                                                                               | 377                                                                               | 81                                                                                | 189                                                                                 | 276                                                                                 | 61                                                                                  | 161                                                                                 | 268                                                                                 | 88                                                                                  |
| Arrive On Green              | 0.11                                                                              | 0.30                                                                              | 0.30                                                                              | 0.06                                                                              | 0.25                                                                              | 0.25                                                                              | 0.23                                                                                | 0.23                                                                                | 0.23                                                                                | 0.23                                                                                | 0.23                                                                                | 0.23                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 1415                                                                              | 373                                                                               | 1767                                                                              | 1480                                                                              | 318                                                                               | 245                                                                                 | 1207                                                                                | 266                                                                                 | 157                                                                                 | 1172                                                                                | 387                                                                                 |
| Grp Volume(v), veh/h         | 138                                                                               | 0                                                                                 | 249                                                                               | 55                                                                                | 0                                                                                 | 294                                                                               | 213                                                                                 | 0                                                                                   | 0                                                                                   | 244                                                                                 | 0                                                                                   | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 0                                                                                 | 1788                                                                              | 1767                                                                              | 0                                                                                 | 1798                                                                              | 1718                                                                                | 0                                                                                   | 0                                                                                   | 1716                                                                                | 0                                                                                   | 0                                                                                   |
| Q Serve(g_s), s              | 2.5                                                                               | 0.0                                                                               | 3.7                                                                               | 1.0                                                                               | 0.0                                                                               | 4.8                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.7                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 2.5                                                                               | 0.0                                                                               | 3.7                                                                               | 1.0                                                                               | 0.0                                                                               | 4.8                                                                               | 3.4                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 4.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.21                                                                              | 1.00                                                                              |                                                                                   | 0.18                                                                              | 0.22                                                                                |                                                                                     | 0.15                                                                                | 0.15                                                                                |                                                                                     | 0.23                                                                                |
| Lane Grp Cap(c), veh/h       | 192                                                                               | 0                                                                                 | 543                                                                               | 106                                                                               | 0                                                                                 | 458                                                                               | 525                                                                                 | 0                                                                                   | 0                                                                                   | 518                                                                                 | 0                                                                                   | 0                                                                                   |
| V/C Ratio(X)                 | 0.72                                                                              | 0.00                                                                              | 0.46                                                                              | 0.52                                                                              | 0.00                                                                              | 0.64                                                                              | 0.41                                                                                | 0.00                                                                                | 0.00                                                                                | 0.47                                                                                | 0.00                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 935                                                                               | 0                                                                                 | 1973                                                                              | 508                                                                               | 0                                                                                 | 1549                                                                              | 1636                                                                                | 0                                                                                   | 0                                                                                   | 1665                                                                                | 0                                                                                   | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 14.3                                                                              | 0.0                                                                               | 9.3                                                                               | 15.1                                                                              | 0.0                                                                               | 11.0                                                                              | 11.2                                                                                | 0.0                                                                                 | 0.0                                                                                 | 11.4                                                                                | 0.0                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 5.0                                                                               | 0.0                                                                               | 0.6                                                                               | 3.9                                                                               | 0.0                                                                               | 1.5                                                                               | 0.5                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.7                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.0                                                                               | 0.0                                                                               | 1.0                                                                               | 0.4                                                                               | 0.0                                                                               | 1.5                                                                               | 1.1                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 1.3                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 19.2                                                                              | 0.0                                                                               | 9.9                                                                               | 19.0                                                                              | 0.0                                                                               | 12.5                                                                              | 11.7                                                                                | 0.0                                                                                 | 0.0                                                                                 | 12.1                                                                                | 0.0                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | B                                                                                 | A                                                                                 | A                                                                                 | B                                                                                 | A                                                                                 | B                                                                                 | B                                                                                   | A                                                                                   | A                                                                                   | B                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 387                                                                               |                                                                                   |                                                                                   | 349                                                                               |                                                                                   |                                                                                   | 213                                                                                 |                                                                                     |                                                                                     | 244                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 13.2                                                                              |                                                                                   |                                                                                   | 13.5                                                                              |                                                                                   |                                                                                   | 11.7                                                                                |                                                                                     |                                                                                     | 12.1                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | B                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                   |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 3                                                                                 | 4                                                                                 | 6                                                                                 |                                                                                   | 7                                                                                   | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 12.1                                                                              |                                                                                   | 6.5                                                                               | 14.5                                                                              | 12.1                                                                              |                                                                                   | 8.1                                                                                 | 12.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                                 | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 30.5                                                                              |                                                                                   | 9.5                                                                               | 36.5                                                                              | 30.5                                                                              |                                                                                   | 17.5                                                                                | 28.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+I1), s | 5.4                                                                               |                                                                                   | 3.0                                                                               | 5.7                                                                               | 6.1                                                                               |                                                                                   | 4.5                                                                                 | 6.8                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 1.3                                                                               |                                                                                   | 0.0                                                                               | 1.5                                                                               | 1.5                                                                               |                                                                                   | 0.3                                                                                 | 1.6                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 12.8                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | B                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 5: Campus Dr/Campus Drive & 7th Street

11/11/2020

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |  |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |  |
| Traffic Volume (veh/h)       | 108                                                                               | 410                                                                               | 53                                                                                | 27                                                                                | 521                                                                               | 62                                                                                | 83                                                                                 | 169                                                                                 | 30                                                                                  | 136                                                                                 | 97                                                                                  | 135                                                                                 |
| Future Volume (veh/h)        | 108                                                                               | 410                                                                               | 53                                                                                | 27                                                                                | 521                                                                               | 62                                                                                | 83                                                                                 | 169                                                                                 | 30                                                                                  | 136                                                                                 | 97                                                                                  | 135                                                                                 |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                              |                                                                                   | 1.00                                                                              | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   | No                                                                                |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                              | 1856                                                                               | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                |
| Adj Flow Rate, veh/h         | 112                                                                               | 427                                                                               | 55                                                                                | 28                                                                                | 543                                                                               | 65                                                                                | 86                                                                                 | 176                                                                                 | 31                                                                                  | 142                                                                                 | 101                                                                                 | 141                                                                                 |
| Peak Hour Factor             | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              | 0.96                                                                               | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                 | 3                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   |
| Cap, veh/h                   | 144                                                                               | 712                                                                               | 92                                                                                | 55                                                                                | 637                                                                               | 76                                                                                | 178                                                                                | 325                                                                                 | 51                                                                                  | 226                                                                                 | 144                                                                                 | 169                                                                                 |
| Arrive On Green              | 0.08                                                                              | 0.44                                                                              | 0.44                                                                              | 0.03                                                                              | 0.39                                                                              | 0.39                                                                              | 0.31                                                                               | 0.31                                                                                | 0.31                                                                                | 0.31                                                                                | 0.31                                                                                | 0.31                                                                                |
| Sat Flow, veh/h              | 1767                                                                              | 1611                                                                              | 207                                                                               | 1767                                                                              | 1626                                                                              | 195                                                                               | 332                                                                                | 1052                                                                                | 164                                                                                 | 475                                                                                 | 466                                                                                 | 546                                                                                 |
| Grp Volume(v), veh/h         | 112                                                                               | 0                                                                                 | 482                                                                               | 28                                                                                | 0                                                                                 | 608                                                                               | 293                                                                                | 0                                                                                   | 0                                                                                   | 384                                                                                 | 0                                                                                   | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1767                                                                              | 0                                                                                 | 1818                                                                              | 1767                                                                              | 0                                                                                 | 1821                                                                              | 1548                                                                               | 0                                                                                   | 0                                                                                   | 1488                                                                                | 0                                                                                   | 0                                                                                   |
| Q Serve(g_s), s              | 3.8                                                                               | 0.0                                                                               | 12.4                                                                              | 1.0                                                                               | 0.0                                                                               | 18.9                                                                              | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 5.2                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 3.8                                                                               | 0.0                                                                               | 12.4                                                                              | 1.0                                                                               | 0.0                                                                               | 18.9                                                                              | 9.5                                                                                | 0.0                                                                                 | 0.0                                                                                 | 14.7                                                                                | 0.0                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.11                                                                              | 1.00                                                                              |                                                                                   | 0.11                                                                              | 0.29                                                                               |                                                                                     | 0.11                                                                                | 0.37                                                                                |                                                                                     | 0.37                                                                                |
| Lane Grp Cap(c), veh/h       | 144                                                                               | 0                                                                                 | 804                                                                               | 55                                                                                | 0                                                                                 | 713                                                                               | 553                                                                                | 0                                                                                   | 0                                                                                   | 539                                                                                 | 0                                                                                   | 0                                                                                   |
| V/C Ratio(X)                 | 0.78                                                                              | 0.00                                                                              | 0.60                                                                              | 0.51                                                                              | 0.00                                                                              | 0.85                                                                              | 0.53                                                                               | 0.00                                                                                | 0.00                                                                                | 0.71                                                                                | 0.00                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 243                                                                               | 0                                                                                 | 1093                                                                              | 166                                                                               | 0                                                                                 | 1015                                                                              | 911                                                                                | 0                                                                                   | 0                                                                                   | 875                                                                                 | 0                                                                                   | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              | 1.00                                                                               | 0.00                                                                                | 0.00                                                                                | 1.00                                                                                | 0.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 27.9                                                                              | 0.0                                                                               | 13.1                                                                              | 29.5                                                                              | 0.0                                                                               | 17.2                                                                              | 17.8                                                                               | 0.0                                                                                 | 0.0                                                                                 | 19.7                                                                                | 0.0                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 8.7                                                                               | 0.0                                                                               | 0.7                                                                               | 7.3                                                                               | 0.0                                                                               | 5.0                                                                               | 0.8                                                                                | 0.0                                                                                 | 0.0                                                                                 | 1.8                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 1.9                                                                               | 0.0                                                                               | 4.4                                                                               | 0.5                                                                               | 0.0                                                                               | 7.7                                                                               | 3.3                                                                                | 0.0                                                                                 | 0.0                                                                                 | 4.9                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 36.6                                                                              | 0.0                                                                               | 13.8                                                                              | 36.8                                                                              | 0.0                                                                               | 22.2                                                                              | 18.6                                                                               | 0.0                                                                                 | 0.0                                                                                 | 21.5                                                                                | 0.0                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | D                                                                                 | A                                                                                 | B                                                                                 | D                                                                                 | A                                                                                 | C                                                                                 | B                                                                                  | A                                                                                   | A                                                                                   | C                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 594                                                                               |                                                                                   |                                                                                   | 636                                                                               |                                                                                   |                                                                                   | 293                                                                                |                                                                                     |                                                                                     | 384                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 18.1                                                                              |                                                                                   |                                                                                   | 22.9                                                                              |                                                                                   |                                                                                   | 18.6                                                                               |                                                                                     |                                                                                     | 21.5                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | B                                                                                 |                                                                                   |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 2                                                                                 |                                                                                   | 3                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 | 7                                                                                  | 8                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 23.6                                                                              |                                                                                   | 6.4                                                                               | 31.9                                                                              |                                                                                   | 23.6                                                                              | 9.5                                                                                | 28.7                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               | 4.5                                                                                | 4.5                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 33.5                                                                              |                                                                                   | 5.8                                                                               | 37.2                                                                              |                                                                                   | 33.5                                                                              | 8.5                                                                                | 34.5                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 11.5                                                                              |                                                                                   | 3.0                                                                               | 14.4                                                                              |                                                                                   | 16.7                                                                              | 5.8                                                                                | 20.9                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 1.8                                                                               |                                                                                   | 0.0                                                                               | 3.0                                                                               |                                                                                   | 2.4                                                                               | 0.1                                                                                | 3.4                                                                                 |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 20.4                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/11/2020

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|------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |                                                                                     |
| Traffic Volume (veh/h)       | 373                                                                               | 216                                                                               | 131                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 872                                                                                 | 207                                                                                 | 171                                                                                 | 658                                                                                 | 0                                                                                   |
| Future Volume (veh/h)        | 373                                                                               | 216                                                                               | 131                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 872                                                                                 | 207                                                                                 | 171                                                                                 | 658                                                                                 | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 405                                                                               | 235                                                                               | 142                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 948                                                                                 | 225                                                                                 | 186                                                                                 | 715                                                                                 | 0                                                                                   |
| Peak Hour Factor             | 0.92                                                                              | 0.92                                                                              | 0.92                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.92                                                                               | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                | 0.92                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 874                                                                               | 276                                                                               | 167                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1620                                                                                | 723                                                                                 | 224                                                                                 | 2254                                                                                | 0                                                                                   |
| Arrive On Green              | 0.26                                                                              | 0.26                                                                              | 0.26                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.46                                                                                | 0.46                                                                                | 0.13                                                                                | 0.64                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 1083                                                                              | 655                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 405                                                                               | 0                                                                                 | 377                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 948                                                                                 | 225                                                                                 | 186                                                                                 | 715                                                                                 | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1738                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 8.5                                                                               | 0.0                                                                               | 17.6                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 16.9                                                                                | 7.7                                                                                 | 8.8                                                                                 | 7.8                                                                                 | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 8.5                                                                               | 0.0                                                                               | 17.6                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 16.9                                                                                | 7.7                                                                                 | 8.8                                                                                 | 7.8                                                                                 | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.38                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 874                                                                               | 0                                                                                 | 443                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1620                                                                                | 723                                                                                 | 224                                                                                 | 2254                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 0.46                                                                              | 0.00                                                                              | 0.85                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.59                                                                                | 0.31                                                                                | 0.83                                                                                | 0.32                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 1066                                                                              | 0                                                                                 | 540                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1620                                                                                | 723                                                                                 | 321                                                                                 | 2254                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 26.8                                                                              | 0.0                                                                               | 30.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 17.0                                                                                | 14.5                                                                                | 36.3                                                                                | 7.0                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 0.4                                                                               | 0.0                                                                               | 10.5                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 1.6                                                                                 | 1.1                                                                                 | 11.5                                                                                | 0.4                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 3.3                                                                               | 0.0                                                                               | 8.1                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 6.5                                                                                 | 2.7                                                                                 | 4.4                                                                                 | 2.6                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 27.2                                                                              | 0.0                                                                               | 40.7                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 18.6                                                                                | 15.6                                                                                | 47.8                                                                                | 7.3                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | C                                                                                 | A                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | B                                                                                   | B                                                                                   | D                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 782                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1173                                                                               |                                                                                     |                                                                                     | 901                                                                                 |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 33.7                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 18.0                                                                               |                                                                                     |                                                                                     | 15.7                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | B                                                                                  |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 15.3                                                                              | 43.7                                                                              | 26.2                                                                              |                                                                                   | 59.0                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 15.5                                                                              | 34.5                                                                              | 26.5                                                                              |                                                                                   | 54.5                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 10.8                                                                              | 18.9                                                                              | 19.6                                                                              |                                                                                   | 9.8                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.2                                                                               | 6.4                                                                               | 2.1                                                                               |                                                                                   | 5.9                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 21.6                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | C                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# HCM 6th Signalized Intersection Summary 12: 11th Avenue & SR 198 EB Off Ramp/3rd Street

11/11/2020

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| Movement                     | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations          |  |  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |  |  |  |  |  |
| Traffic Volume (veh/h)       | 570                                                                               | 122                                                                               | 116                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 1180                                                                                | 314                                                                                 | 556                                                                                 | 1284                                                                                | 0                                                                                   |
| Future Volume (veh/h)        | 570                                                                               | 122                                                                               | 116                                                                               | 0                                                                                 | 0                                                                                 | 0                                                                                 | 0                                                                                  | 1180                                                                                | 314                                                                                 | 556                                                                                 | 1284                                                                                | 0                                                                                   |
| Initial Q (Qb), veh          | 0                                                                                 | 0                                                                                 | 0                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   | 0                                                                                   |
| Ped-Bike Adj(A_pbT)          | 1.00                                                                              |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 1.00                                                                                |
| Parking Bus, Adj             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Work Zone On Approach        | No                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | No                                                                                 |                                                                                     |                                                                                     | No                                                                                  |                                                                                     |                                                                                     |
| Adj Sat Flow, veh/h/ln       | 1856                                                                              | 1856                                                                              | 1856                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1856                                                                                | 1856                                                                                | 1856                                                                                | 1856                                                                                | 0                                                                                   |
| Adj Flow Rate, veh/h         | 594                                                                               | 127                                                                               | 121                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1229                                                                                | 327                                                                                 | 579                                                                                 | 1338                                                                                | 0                                                                                   |
| Peak Hour Factor             | 0.96                                                                              | 0.96                                                                              | 0.96                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.96                                                                               | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                | 0.96                                                                                |
| Percent Heavy Veh, %         | 3                                                                                 | 3                                                                                 | 3                                                                                 |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3                                                                                   | 3                                                                                   | 3                                                                                   | 3                                                                                   | 0                                                                                   |
| Cap, veh/h                   | 670                                                                               | 171                                                                               | 163                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1254                                                                                | 559                                                                                 | 591                                                                                 | 2567                                                                                | 0                                                                                   |
| Arrive On Green              | 0.20                                                                              | 0.20                                                                              | 0.20                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.36                                                                                | 0.36                                                                                | 0.33                                                                                | 0.73                                                                                | 0.00                                                                                |
| Sat Flow, veh/h              | 3428                                                                              | 874                                                                               | 832                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 3618                                                                                | 1572                                                                                | 1767                                                                                | 3618                                                                                | 0                                                                                   |
| Grp Volume(v), veh/h         | 594                                                                               | 0                                                                                 | 248                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1229                                                                                | 327                                                                                 | 579                                                                                 | 1338                                                                                | 0                                                                                   |
| Grp Sat Flow(s),veh/h/ln     | 1714                                                                              | 0                                                                                 | 1706                                                                              |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1763                                                                                | 1572                                                                                | 1767                                                                                | 1763                                                                                | 0                                                                                   |
| Q Serve(g_s), s              | 19.9                                                                              | 0.0                                                                               | 16.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 40.7                                                                                | 20.0                                                                                | 38.3                                                                                | 19.6                                                                                | 0.0                                                                                 |
| Cycle Q Clear(g_c), s        | 19.9                                                                              | 0.0                                                                               | 16.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 40.7                                                                                | 20.0                                                                                | 38.3                                                                                | 19.6                                                                                | 0.0                                                                                 |
| Prop In Lane                 | 1.00                                                                              |                                                                                   | 0.49                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     | 0.00                                                                                |
| Lane Grp Cap(c), veh/h       | 670                                                                               | 0                                                                                 | 334                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1254                                                                                | 559                                                                                 | 591                                                                                 | 2567                                                                                | 0                                                                                   |
| V/C Ratio(X)                 | 0.89                                                                              | 0.00                                                                              | 0.74                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 0.98                                                                                | 0.58                                                                                | 0.98                                                                                | 0.52                                                                                | 0.00                                                                                |
| Avail Cap(c_a), veh/h        | 726                                                                               | 0                                                                                 | 361                                                                               |                                                                                   |                                                                                   |                                                                                   | 0                                                                                  | 1254                                                                                | 559                                                                                 | 591                                                                                 | 2567                                                                                | 0                                                                                   |
| HCM Platoon Ratio            | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Upstream Filter(I)           | 1.00                                                                              | 0.00                                                                              | 1.00                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 0.00                                                                                |
| Uniform Delay (d), s/veh     | 46.2                                                                              | 0.0                                                                               | 44.7                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 37.6                                                                                | 31.0                                                                                | 38.9                                                                                | 7.0                                                                                 | 0.0                                                                                 |
| Incr Delay (d2), s/veh       | 12.1                                                                              | 0.0                                                                               | 7.5                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 21.1                                                                                | 4.4                                                                                 | 31.7                                                                                | 0.8                                                                                 | 0.0                                                                                 |
| Initial Q Delay(d3),s/veh    | 0.0                                                                               | 0.0                                                                               | 0.0                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 | 0.0                                                                                 |
| %ile BackOfQ(50%),veh/ln     | 9.3                                                                               | 0.0                                                                               | 7.3                                                                               |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 20.5                                                                                | 8.0                                                                                 | 21.5                                                                                | 6.8                                                                                 | 0.0                                                                                 |
| Unsig. Movement Delay, s/veh |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| LnGrp Delay(d),s/veh         | 58.3                                                                              | 0.0                                                                               | 52.2                                                                              |                                                                                   |                                                                                   |                                                                                   | 0.0                                                                                | 58.7                                                                                | 35.4                                                                                | 70.6                                                                                | 7.8                                                                                 | 0.0                                                                                 |
| LnGrp LOS                    | E                                                                                 | A                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                   | A                                                                                  | E                                                                                   | D                                                                                   | E                                                                                   | A                                                                                   | A                                                                                   |
| Approach Vol, veh/h          | 842                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 1556                                                                               |                                                                                     |                                                                                     | 1917                                                                                |                                                                                     |                                                                                     |
| Approach Delay, s/veh        | 56.5                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | 53.8                                                                               |                                                                                     |                                                                                     | 26.8                                                                                |                                                                                     |                                                                                     |
| Approach LOS                 | E                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | D                                                                                  |                                                                                     |                                                                                     | C                                                                                   |                                                                                     |                                                                                     |
| Timer - Assigned Phs         | 1                                                                                 | 2                                                                                 | 4                                                                                 |                                                                                   | 6                                                                                 |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Phs Duration (G+Y+Rc), s     | 44.0                                                                              | 46.5                                                                              | 27.6                                                                              |                                                                                   | 90.5                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Change Period (Y+Rc), s      | 4.5                                                                               | 4.5                                                                               | 4.5                                                                               |                                                                                   | 4.5                                                                               |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Green Setting (Gmax), s  | 39.5                                                                              | 42.0                                                                              | 25.0                                                                              |                                                                                   | 86.0                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Max Q Clear Time (g_c+l1), s | 40.3                                                                              | 42.7                                                                              | 21.9                                                                              |                                                                                   | 21.6                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Green Ext Time (p_c), s      | 0.0                                                                               | 0.0                                                                               | 1.2                                                                               |                                                                                   | 15.6                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary         |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th Ctrl Delay           | 42.3                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 6th LOS                  | D                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# **APPENDIX D**

Chapter 400 of Caltrans' Highway Design Manual (HDM)

## CHAPTER 400

### INTERSECTIONS AT GRADE

Intersections are planned points of conflict where two or more roadways join or cross. At-grade intersections are among the most complicated elements on the highway system, and control the efficiency, capacity, and safety for motorized and non-motorized users of the facility. The type and operation of an intersection is important to the adjacent property owners, motorists, bicyclists, pedestrians, transit operators, the trucking industry, and the local community.

There are two basic types of at grade intersections: crossing and circular. It is not recommended that intersections have more than four legs. Occasionally, local development and land uses create the need for a more complex intersection design. Such intersections may require a specialized intersection design to handle the specific traffic demands at that location. In addition to the guidance in this manual, see Traffic Operations Policy Directive (TOPD) Number 13-02: Intersection Control Evaluation (ICE) for direction and procedures on the evaluation, comparison and selection of the intersection types and control strategies identified in Index 401.5. Also refer to the Complete Streets Intersection Guide for further information.

### Topic 401 - Factors Affecting Design

#### Index 401.1 - General

At-grade intersections must handle a variety of conflicts among users, which includes truck, transit, pedestrians, and bicycles. These recurring conflicts play a major role in the preparation of design standards and guidelines. Arriving, departing, merging, turning, and crossing paths of moving pedestrians, bicycles, truck, and vehicular traffic have to be accommodated within a relatively small area. The objective of designing an intersection is to effectively balance the convenience, ease, and comfort of the users, as well as the human factors, with moving traffic (automobiles, trucks, motorcycles, transit vehicles, bicycles, pedestrians, etc.). The safety and mobility needs of motorist, bicyclist and pedestrians as well as their movement patterns in intersections must be analyzed early in the planning phase and then

followed through appropriately during the design phase of all intersections on the State highway. It is Departmental policy to develop integrated multimodal projects in balance with community goals, plans, and values.

The Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians contains a primer on the factors to consider when designing intersections. It is published by the California Division of Traffic Operations.

#### 401.2 Human Factors

- (1) *The Driver.* An appreciation of driver performance is essential to proper highway design and operation. The suitability of a design rests as much on how safely and efficiently drivers are able to use the highway as on any other criterion.

Motorist's perception and reaction time set the standards for sight distance and length of transitions. The driver's ability to understand and interpret the movements and crossing times of the other vehicle drivers, bicyclists, and pedestrians using the intersection is equally important when making decisions and their associated reactions. The designer needs to keep in mind the user's limitations and therefore design intersections so that they meet user expectation.

- (2) *The Bicyclist.* Bicyclist experience, skills and physical capabilities are factors in intersection design. Intersections are to be designed to help bicyclists understand how to traverse the intersection. Chapter 1000 provides intersection guidance for Class I and Class III bikeways that intersect the State highway system. The guidance in this chapter specifically relates to bicyclists that operate within intersections on the State highway system.
- (3) *The Pedestrian.* Understanding how pedestrians will use an intersection is critical because pedestrian volumes, their age ranges, physical ability, etc. all factor in to their startup time and the time it takes them to cross an intersection and thus, dictates how to design the intersection to avoid potential conflicts with bicyclists and motor vehicles. The guidance in this chapter specifically relates to pedestrian travel within



intersections on the State highway system. See Topic 105, Pedestrian Facilities, Design Information Bulletin 82 - “Pedestrian Accessibility Guidelines for Highway Projects,” the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, and the California Manual on Uniform Traffic Control Devices (California MUTCD) for additional guidance.

401.3 Traffic Considerations

Good intersection design clearly indicates to bicyclists and motorists how to traverse the intersection (see Figure 403.6A). Designs that encourage merging traffic to yield to through bicycle and motor vehicle traffic are desirable.

The size, maneuverability, and other characteristics of bicycles and motorized vehicles (automobiles, trucks, transit vehicles, farm equipment, etc.) are all factors that influence the design of an intersection. The differences in operating characteristics between bicycles and motor vehicles should be considered early in design.

Table 401.3 compares vehicle characteristics to intersection design elements.

A design vehicle is a convenient means of representing a particular segment of the vehicle population. See Topic 404 for a further discussion of the uses of design vehicles.

Transit vehicles and how their stops interrelate with an intersection, pedestrian desired walking patterns and potential transfers to other transit facilities are another critical factor to understand when designing an intersection. Transit stops and their placement needs to take into account the required maintenance operations that will be needed and usually supplied by the Transit Operator.

401.4 The Physical Environment

In highly developed urban areas, where right of way is usually limited, the volume of vehicular traffic, pedestrians, and bicyclists may be large, street parking exists, and transit stops (for both buses and light rail) are available. All interact in a variety of movements that contribute to and add to the complexity of a State highway and can result in busy intersections.

Industrial development may require special attention to the movement of large trucks.

Rural areas where farming occurs may require special attention for specialized farm equipment. In addition, rural cities or town centers (rural main streets) also require special attention.

Rural intersections in farm areas with low traffic volumes may have special visibility problems or require shadowing of left-turn vehicles from high speed approach traffic.

Table 401.3

| Vehicle Characteristics | Intersection Design Element Affected     |
|-------------------------|------------------------------------------|
| Length                  | Length of storage lane                   |
| Width                   | Lane width                               |
| Height                  | Clearance to overhead signs and signals  |
| Wheel base              | Corner radius and width of turning lanes |
| Acceleration            | Tapers and length of acceleration lane   |
| Deceleration            | Tapers and length of deceleration lane   |

There are many factors to be considered in the design of intersections, with the goal to achieve a functional, safe and efficient intersection for all users of the facility. The location and level of use by various modes will have an impact on intersection design, and therefore should be considered early in the design process. In addition to current levels of use, it is important to consider future travel patterns for vehicles, including trucks; pedestrian and bicycle demand and the future expansion of transit.

401.5 Intersection Type

Intersection types are characterized by their basic geometric configuration, and the form of intersection traffic control that is employed:

**(1) Geometric Configurations**

- (a) Crossing-Type Intersections - “Tee” and 4-legged intersections
- (b) Circular Intersections –roundabouts, traffic circles, rotaries; however, only roundabouts are acceptable for State highways.
- (c) Alternative Intersection Designs – various effective geometric alternatives to traditional designs that can reduce crashes and their severity, improve operations, reduce congestion and delay typically by reducing or altering the number of conflict points; these alternatives include geometric design features such as intersections with displaced left-turns or variations on U-turns.

**(2) Intersection Control strategies, See California MUTCD and Traffic Operations Policy Directive (TOPD) Number 13-02, Intersection Control Evaluation for procedures and guidance on how to evaluate, compare and select from among the following intersection control strategies:**

- (a) Two-Way Stop Controlled - for minor road traffic
- (b) All-Way Stop Control
- (c) Signal Control
- (d) Yield Control (Roundabout)

Historically, crossing-type intersections with signal or “STOP”-control have been used on the State highway system. However, other intersection types, given the appropriate circumstances may enhance intersection performance through fewer or less severe crashes and improve operations by reducing overall delay. Alternative intersection geometric designs should be considered and evaluated early in the project scoping, planning and decision-making stages, as they may be more efficient, economical and safer solutions than traditional designs. Alternative intersection designs can effectively balance the safety and mobility needs of the motor vehicle drivers, transit riders, bicyclists and pedestrians using the intersection.

**401.6 Transit**

Transit use may range from periodic buses, handled as part of the normal mix of vehicular traffic, to Bus Rapid Transit (BRT) or light rail facilities which can

have a large impact on other users of the intersection. Consideration of these modes should be part of the early planning and design of intersections.

**Topic 402 - Operational Features Affecting Design****402.1 Capacity**

Adequate capacity to handle peak period traffic demands is a basic goal of intersection design.

- (1) *Unsignalized Intersections.* The “Highway Capacity Manual”, provides methodology for capacity analysis of unsignalized intersections controlled by “STOP” or “YIELD” signs. The assumption is made that major street traffic is not affected by the minor street movement. Unsignalized intersections generally become candidates for signalization when traffic backups begin to develop on the cross street or when gaps in traffic are insufficient for drivers to yield to crossing pedestrians. See the California MUTCD, for signal warrants. Changes to intersection controls must be coordinated with District Traffic Branch.
- (2) *Signalized Intersections.* See Topic 406 for analysis of simple signalized intersections, including ramps. The analysis of complex and alternative intersections should be referred to the District Traffic Branch; also see Traffic Operations Policy Directive (TOPD) Number 13-02.
- (3) *Roundabout Intersections.* See TOPD Number 13-02 for screening process and the Intersection Control Evaluation(ICE) Process Informational Guide for operational analysis methods and tools.

**402.2 Collisions**

- (1) *General.* Intersections have a higher potential for conflict compared to other sections of the highway because travel is interrupted, traffic streams cross, and many types of turning movements occur.

The type of traffic control affects the type of collisions. Signalized intersections tend to have more rear end and same-direction

sideswipes than intersections with “STOP”-control on minor legs. Roundabouts experience few angle or crossing collisions. Roundabouts reduce the frequency and severity of collisions, especially when compared to the performance of signalized intersections in high speed environments. Other alternative intersection types are configurations to consider for minimizing the number of conflict points.

(2) *Undesirable Geometric Features.*

- Inadequate approach sight distance.
- Inadequate corner sight distance.
- Steep grades.
- Five or more approaches.
- Presence of curves within intersections(unless at roundabouts).
- Inappropriately large curb radii.
- Long pedestrian crossing distances.
- Intersection Angle <75 degrees (see Topic 403).

### 402.3 On-Street Parking

On-street parking generally decreases through-traffic capacity, impedes traffic flow, and increases crash potential. Where the primary service of the arterial is the movement of vehicles, it may be desirable to prohibit on-street parking on State highways in urban and suburban expressways and rural arterial sections. However, within urban and suburban areas and in rural communities located on State highways, on-street parking should be considered in order to accommodate existing land uses. Where adequate off-street parking facilities are not available, the designer should consider on-street parking, so that the proposed highway improvement will be compatible with the land use. On-street parking as well as off-street parking needs to comply with DIB82. See AASHTO, A Policy on Geometric Design of Highways and Streets for additional guidance related to on-street parking.

### 402.4 Consider All Users

Intersections should accommodate all users of the facility, including vehicles, bicyclists, pedestrians and transit. Bicycles have all the rights and responsibilities as motorist per the California

Vehicle Code, but should have separate consideration of their needs, even separate facilities if volumes warrant. Pedestrians should not be prohibited from crossing one or more legs of an intersection, unless no other safe alternative exists. Pedestrians can be prohibited from crossing one or more legs of an intersection if a reasonable alternate route exists and there is a demonstrated need to do so. All pedestrian facilities shall be ADA compliant as outlined in DIB 82. Transit needs should be determined early in the planning and design phase as their needs can have a large impact on the performance of an intersection. Transit stops in the vicinity of intersections should be evaluated for their effect on the safety and operation of the intersection(s) under study. See Topic 108 for additional information.

### 402.5 Speed-Change Areas

Speed-change areas for vehicles entering or leaving main streams of traffic are beneficial to the safety and efficiency of an intersection. Entering traffic merges most efficiently with through traffic when the merging angle is less than 15 degrees and when speed differentials are at a minimum.

## Topic 403 - Principles of Channelization

### 403.1 Preference to Major Movements

The provision of direct free-flowing high-standard alignment to give preference to major movements is good channelization practice. This may require some degree of control of the minor movements such as stopping, funneling, or even eliminating them. These controlling measures should conform to natural paths of movement and should be introduced gradually to promote smooth and efficient operation.

### 403.2 Areas of Conflict

Large multilane undivided intersection areas are undesirable. The hazards of conflicting movements are magnified when motorists, bicyclists, and pedestrians are unable to anticipate movements of other users within these areas. Channelization reduces areas of conflict by separating or regulating traffic movements into definite paths of travel by the use of pavement markings or traffic islands.

Multilane undivided intersections, even with signalization, are more difficult for pedestrians to cross. Providing pedestrian refuge islands enable pedestrians to cross fewer lanes at a time.

See Index 403.7 for traffic island guidance when used as pedestrian refuge. Curb extensions shorten crossing distance and increase visibility. See Index 303.4 for curb extensions.

### 403.3 Angle of Intersection

A right angle (90°) intersection provides the most favorable conditions for intersecting and turning traffic movements. Specifically, a right angle provides:

- The shortest crossing distance for motor vehicles, bicycles, and pedestrians.
- Sight lines which optimize corner sight distance and the ability of motorists to judge the relative position and speed of approach traffic.
- Intersection geometry that can reduce vehicle turning speeds so collisions are more easily avoided and the severity of collisions are minimized.
- Intersection geometry that sends a message to turning bicyclists and motorists that they are making a turning movement and should yield as appropriate to through traffic on the roadway they are leaving, to traffic on the receiving roadway, and to pedestrians crossing the intersection.

Minor deviations from right angles are generally acceptable provided that the potentially detrimental impact on visibility and turning movements for large trucks (see Topic 404) can be mitigated. However, large deviations from right angles may decrease visibility, hamper certain turning operations, and will increase the size of the intersection and therefore crossing distances for bicyclists and pedestrians, may encourage high speed turns, and may reduce yielding by turning traffic. When a right angle cannot be provided due to physical constraints, the interior angle should be designed as close to 90 degrees as is practical, but should not be less than 75 degrees. Mitigation should be considered for the affected intersection design features. (See Figure 403.3A). A 75 degree angle does not unreasonably increase the crossing distance or generally decrease visibility. Class II bikeway crossings at railroads follow similar

guidance to Class I bikeway crossings at railroads, see Index 1003.5(3), and Figure 403.3B.

A characteristic of skewed intersection angles is that they result in larger intersections.

When existing intersection angles are less than 75 degrees, the following retrofit improvement strategies should be considered:

- Realign the subordinate intersection legs if the new alignment and intersection location(s) can be designed without introducing new geometric or operational deficiencies.
- Provide acceleration lanes for difficult turning movements due to radius or limited visibility.
- Restrict problematic turning movements; e.g. for minor road left turns with potentially limited visibility.
- Provide refuge areas for pedestrians at very long crossings.

For additional guidance on the above and other improvement strategies, consult with the District Design Liaison.

Particular attention should be given to skewed angles on curved alignment with regards to sight distance and visibility. Crossroads skewed to the left have more restricted visibility for drivers of vans and trucks than crossroads skewed to the right. In addition, severely skewed intersection angles, coupled with steep downgrades (generally over 4 percent) can increase the potential for high centered vehicles to overturn where the vehicle is on a downgrade and must make a turn greater than 90 degrees onto a crossroad. These factors should be considered in the design of skewed intersections.

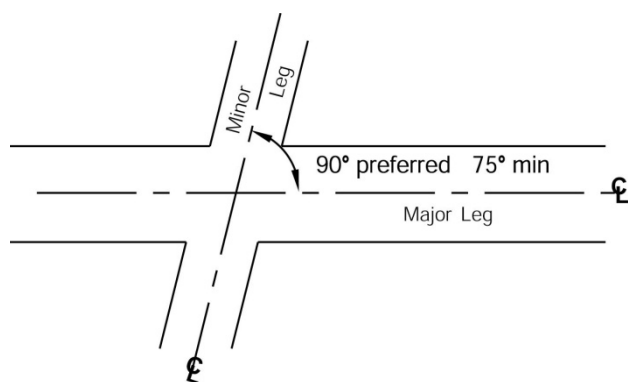
### 403.4 Points of Conflict

Channelization separates and clearly defines points of conflict within the intersection. Bicyclists, pedestrians and motorists should be exposed to only one conflict or confronted with one decision at a time.

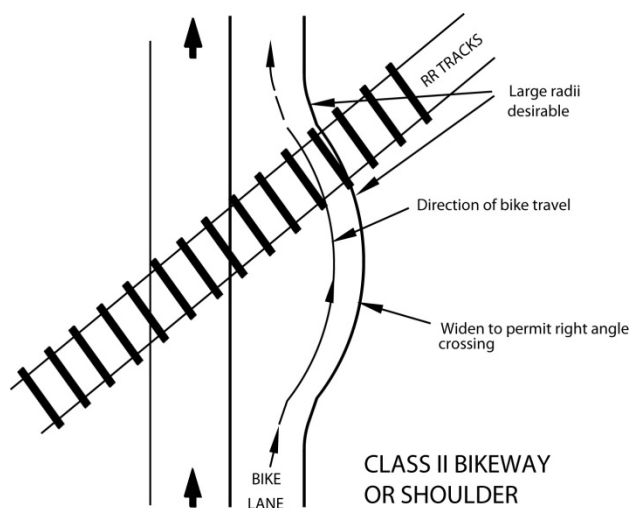
Speed-change areas for diverging traffic should provide adequate length clear of the through lanes to permit vehicles to decelerate after leaving the through lanes.

See AASHTO, A Policy on Geometric Design of Highways and Streets for additional guidance on speed-change lanes.

**Figure 403.3A**  
**Angle of Intersection**  
**(Minor Leg Skewed to the Right)**



**Figure 403.3B**  
**Class II Bikeway**  
**Crossing Railroad**



#### 403.5 (Currently Not In Use)

#### 403.6 Turning Traffic

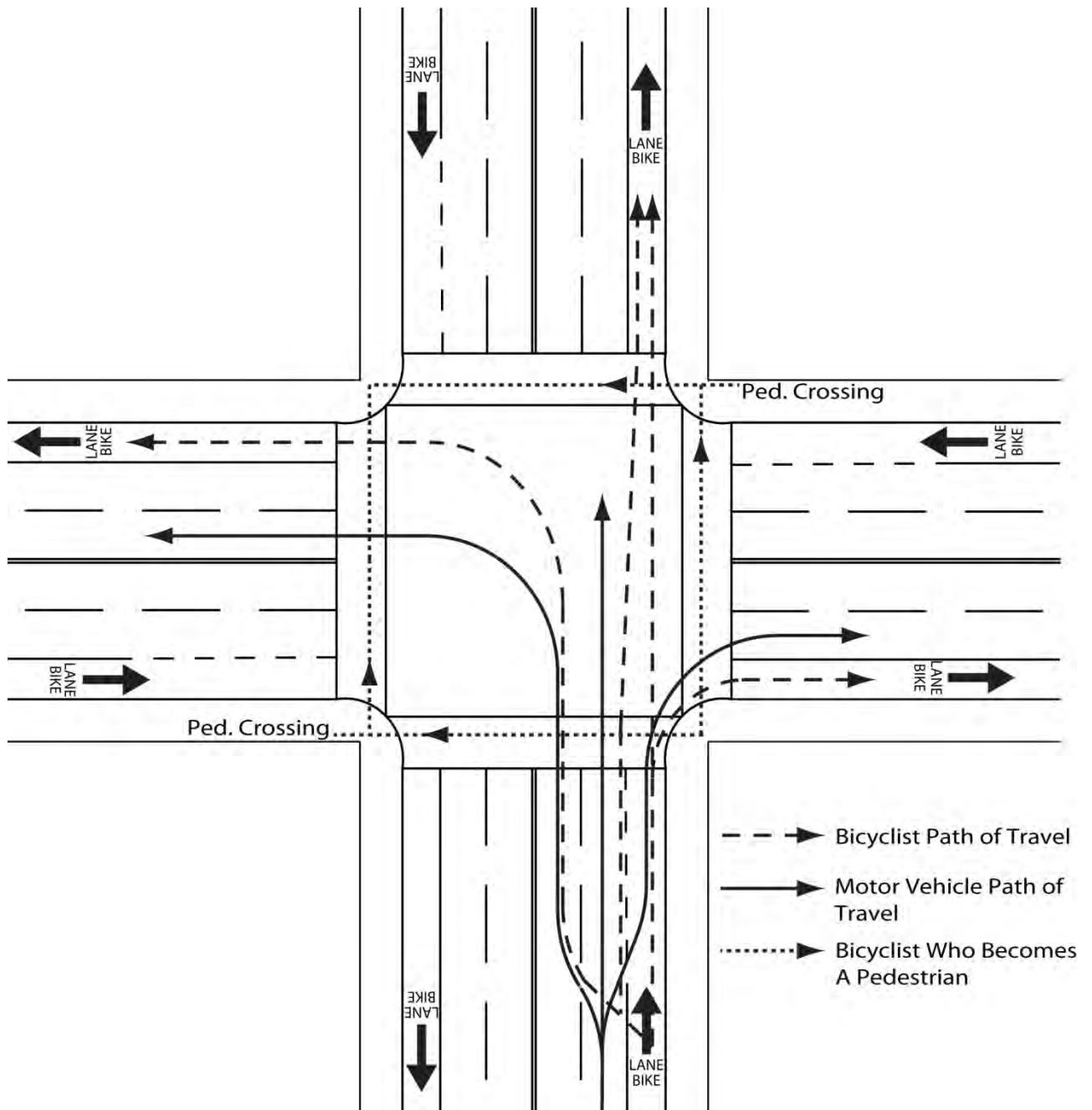
A separate turning lane removes turning movements from the intersection area. Abrupt changes in alignment or sight distance should be avoided, particularly where traffic turns into a separate turning lane from a high-standard through facility.

For wide medians, consider the use of offset left-turn lanes at both signalized and unsignalized intersections. Opposing left-turn lanes are offset or shifted as far to the left as practical by reducing the width of separation immediately before the intersection. Rather than aligning the left-turn lane exactly parallel with and adjacent to the through lane, the offset left-turn lane is separated from the adjacent through lane. Offset left-turn lanes provide improved visibility of opposing through traffic. For further guidance on offset left-turn lanes, see AASHTO, A Policy on Geometric Design of Highways and Streets.

- (1) *Treatment of Intersections with Right-Turn-Only Lanes.* Most motor vehicle/bicycle collisions occur at intersections. For this reason, intersection design should be accomplished in a manner that will minimize confusion by motorists and bicyclists, eliminate ambiguity and induce all road users to operate in accordance with the statutory rules of the road in the California Vehicle Code. Right-turn-only lanes should be designed to meet user expectations and reduce conflicts between vehicles and bicyclists.

Figure 403.6A illustrates a typical at-grade intersection of multilane streets without right-turn-only lanes. Bike lanes or shoulders are included on all approaches. Some common movements of motor vehicles and bicycles are shown. A prevalent crash type is between straight-through bicyclists and right-turning motorists, who do not yield to through bicyclists.

Optional right-turn lanes should not be used in combination with right-turn-only lanes on roads where bicycle travel is permitted. The use of optional right-turn lanes in combination with right-turn-only lanes is not recommended in any case where a Class II bike lane is present. This may increase the need for dual or triple right-turn-only lanes, which have

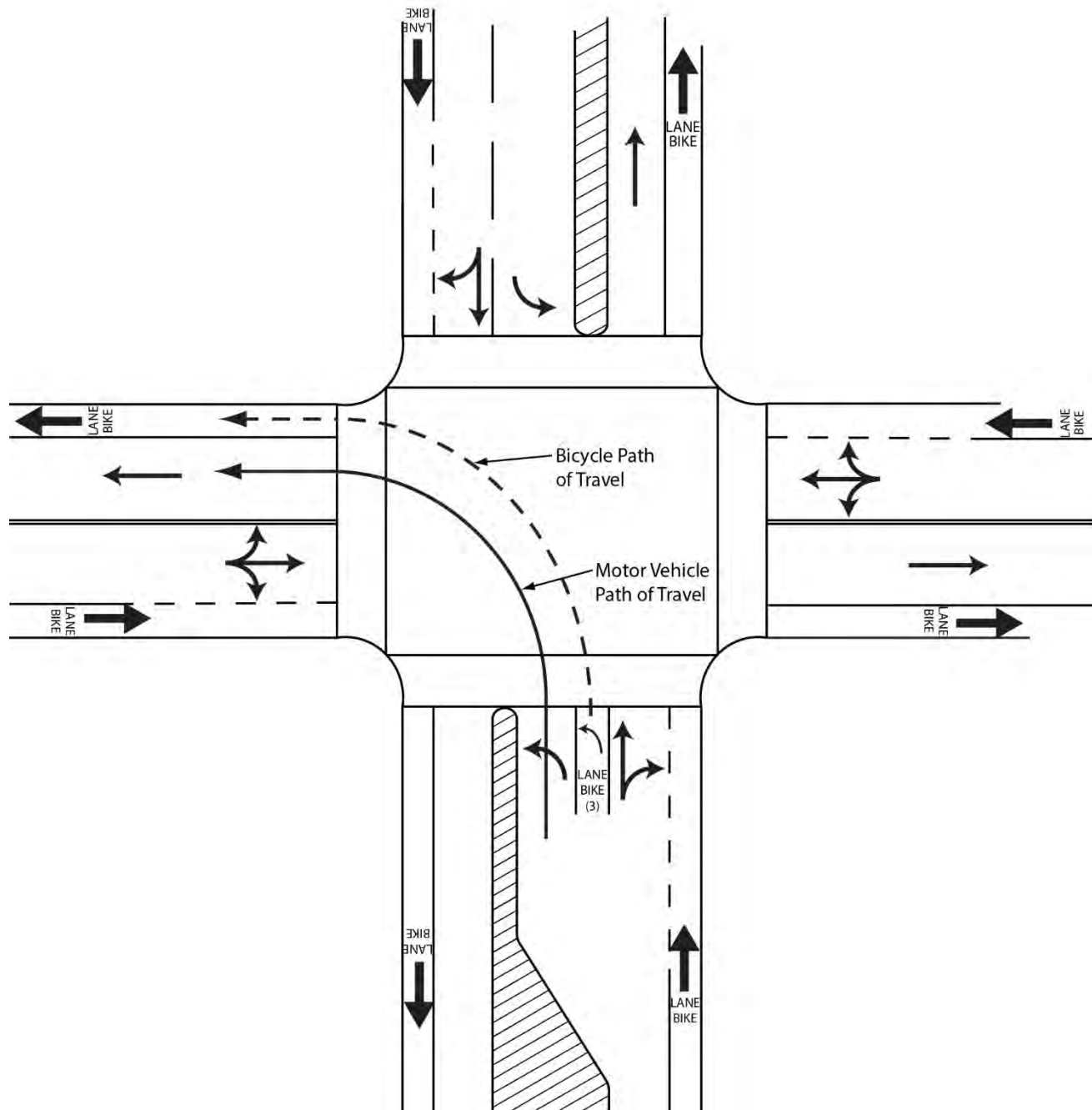
**Figure 403.6A****Typical Bicycle and Motor Vehicle Movements at Intersections of Multilane Streets without Right-Turn-Only Lanes**

NOTE:

Only one direction is shown for clarity.



**Figure 403.6B**  
**Bicycle Left-Turn-Only Lane**



NOTES:

- (1) For bicycle lane markings, see the California MUTCD.
- (2) Bicycle detectors are necessary for signalized intersections.
- (3) Left-turn bicycle lane should have receiving bike lane or shoulder.

challenges with visibility between turning vehicles and pedestrians. Multiple right-turn-only lanes should not be free right-turns when there is a pedestrian crossing. If there is a pedestrian crossing on the receiving leg of multiple right-turn-only lanes, the intersection should be controlled by a pedestrian signal head, or geometrically designed such that pedestrians cross only one turning lane at a time.

Locations with right-turn-only lanes should provide a minimum 4-foot width for bicycle use between the right-turn and through lane when bikes are permitted, except where posted speed is greater than 40 miles per hour, the minimum width should be 6 feet. Configurations that create a weaving area without defined lanes should not be used.

For signing and delineation of bicycle lanes at intersections, consult District Traffic Operations.

Figure 403.6B depicts an intersection with a left-turn-only bicycle lane, which should be considered when bicycle left-turns are common. A left-turn-only bicycle lane may be considered at any intersection and should always be considered as a tool to provide mobility for bicyclists. Signing and delineation options for bicycle left-turn-only lanes are shown in the California MUTCD.

- (2) *Design of Intersections at Interchanges.* The design of at-grade intersections at interchanges should be accomplished in a manner that will minimize confusion of motorists, bicyclists, and pedestrians. Higher speed, uncontrolled entries and exits from freeway ramps should not be used at the intersection of the ramps with the local road. The smallest curb return radius should be used that accommodates the design vehicle. Intersections with interior angles close to 90 degrees reduce speeds at conflict points between motorists, bicyclists, and pedestrians. The intersection skew guidance in Index 403.3 applies to all ramp termini at the local road.

### 403.7 Refuge Areas

Traffic islands should be used to provide refuge areas for bicyclists and pedestrians. See Index 405.4 for further guidance.

### 403.8 Prohibited Turns

Traffic islands may be used to direct bicycle and motorized vehicle traffic streams in desired directions and prevent undesirable movements. Care should be taken so that islands used for this purpose accommodate convenient and safe pedestrian and bicycle crossings, drainage, and striping options. See Topic 303.

### 403.9 Effective Signal Control

At intersections with complex turning movements, channelization is required for effective signal control. Channelization permits the sorting of approaching bicycles and motorized vehicles which may move through the intersection during separate signal phases. Pedestrians may also have their own signal phase. This requirement is of particular importance when traffic-actuated signal controls are employed.

The California MUTCD has warrants for the placement of signals to control vehicular, bicycle and pedestrian traffic. Pedestrian activated devices, signals or beacons are not required, but must be evaluated where directional, multilane, pedestrian crossings occur. These locations may include:

- Mid-block street crossings;
- Channelized turn lanes;
- Ramp entries and exits; and
- Roundabouts.

The evaluation, selection, programming and use of a chosen device should be done with guidance from District Traffic Operations.

### 403.10 Installation of Traffic Control Devices

Channelization may provide locations for the installation of essential traffic control devices, such as “STOP” and directional signs. See Index 405.4 for information about the design of traffic islands.

### 403.11 Summary

- Give preference to the major move(s).

- Reduce areas of conflict.
- Reduce the duration of conflicts.
- Cross traffic at right angles or skew no more than 75 degrees. (90 degrees preferred.)
- Separate points of conflict.
- Provide speed-change areas and separate turning lanes where appropriate.
- Provide adequate width to shadow turning traffic.
- Restrict undesirable moves with traffic islands.
- Coordinate channelization with effective signal control.
- Install signs in traffic islands when necessary but avoid building conflicts one or more modes of travel.
- Consider all users.

### 403.12 Other Considerations

- An advantage of curbed islands is they can serve as pedestrian refuge. Where curbing is appropriate, consideration should be given to mountable curbs. See Topic 303 for more guidance.
- Avoid complex intersections that present multiple choices of movement to the motorist and bicyclist.
- Traffic safety should be considered. Collision records provide a valuable guide to the type of channelization needed.

## Topic 404 - Design Vehicles

### 404.1 General

Any vehicle, whether car, bus, truck, or recreational vehicle, while turning a curve, covers a wider path than the width of the vehicle. The outer front tire can generally follow a circular curve, but the inner rear tire will swing in toward the center of the curve.

Some terminology is vital to understanding the engineering concepts related to design vehicles. See Index 62.4 Interchanges and Intersection at Grade for terminology.

### 404.2 Design Considerations

It may not be necessary to provide for design vehicle turning movements at all intersections along the State route if the design vehicle's route is restricted or it is not expected to use the cross street frequently. Discuss with Traffic Operations and the local agency before a turning movement is not provided. The goal is to minimize possible conflicts between vehicles, bicycles, pedestrians, and other users of the roadway, while providing the minimum curb radii appropriate for the given situation.

Both the tracking width and swept width should be considered in the design of roadways for use of the roadway by design vehicles.

Tracking width lines delineate the path of the vehicle tires as the vehicle moves through the turn.

Swept width lines delineate the path of the vehicle body as the vehicle moves through the turn and will therefore always exceed the tracking width. The following list of criteria is to be used to determine whether the roadway can accommodate the design vehicle.

#### (1) *Traveled way.*

- (a) To accommodate turn movements (e.g., at intersections, driveways, alleys, etc.), the travel way width and intersection design should be such that tracking width and swept width lines for the design vehicle do not cross into any portion of the lane for opposing traffic. Encroachment into the shoulder and bike lane is permitted.

- (b) Along the portion of roadway where there are no turning options, vehicles are required to stay within the lane lines. **The tracking and swept widths lines for the design vehicle shall stay within the lane as defined in Index 301.1 and Table 504.3.** This includes no encroachment into Class II bike lanes.

- (2) *Shoulders.* Both tracking width and swept width lines may encroach onto paved shoulders to accommodate turning. For design projects where the tracking width lines are shown to encroach onto paved shoulders, the shoulder pavement structure should be engineered to sustain the weight of the design vehicle. See Index 613 for general traffic loading

considerations and Index 626 for tied rigid shoulder guidance. At corners where no sidewalks are provided and pedestrians are using the shoulder, a paved refuge area may be provided outside the swept width of turning vehicle.

- (3) *Curbs and Gutters.* Tires may not mount curbs. If curb and gutter are present and any portion of the gutter pan is likewise encroached, the gutter pan must be engineered to match the adjacent shoulder pavement structure. See Index 613.5(2)(c) for gutter pan design guidance.
- (4) *Edge of Pavement.* To accommodate a turn, the swept width lines may cross the edge of pavement provided there are no obstructions. The tracking width lines must remain on the pavement structure, including the shoulder, provided that the shoulder is designed to support vehicular traffic. If truck volumes are high, consideration of a wider shoulder is encouraged in order to preserve the pavement edge.
- (5) *Bicycle Lanes.* Where bicycle lanes are considered, the design guidance noted above applies. Vehicles are permitted to cross a bicycle lane to initiate or complete a turning movement or for emergency parking on the shoulder. See the California MUTCD for Class II bike lane markings.  
  
To accommodate turn movements (e.g., intersections, driveways, alleys, etc. are present), both tracking width and swept width lines may cross the broken white painted bicycle lane striping in advance of the right-turn, entering the bicycle lane when clear to do so.
- (6) *Sidewalks.* Tracking width and swept width lines must not encroach onto sidewalks or pedestrian refuge areas, without exception.
- (7) *Obstacles.* Swept width lines may not encroach upon obstacles including, but not limited to, curbs, islands, sign structures, traffic delineators/channelizers, traffic signals, lighting poles, guardrails, trees, cut slopes, and rock outcrops.
- (8) *Appurtenances.* Swept width lines do not include side mirrors or other appurtenances allowed by the California Vehicle Code, thus,

accommodation to non-motorized users of the facility and appurtenances should be considered.

If both the tracking width and swept width lines meet the design guidance listed above, then the geometry is adequate for that design vehicle. Consideration should be given to pedestrian crossing distance, motor vehicle speeds, truck volumes, alignment, bicycle lane width, sight distance, and the presence of on-street parking.

Note that the STAA Design Vehicle has a template with a 56-foot (minimum) and a 67-foot (longer) radius and the California Legal Design Vehicle has a template with 50-foot (minimum) and 60-foot (longer) radii. These templates are shown in Figures 404.5A through 404.5D. The longer radius templates are more conservative. The longer radius templates develop less swept width and leave a margin of error for the truck driver. The longer radius templates should be used for conditions where the vehicle may not be required to stop before entering the intersection.

The minimum radius template can be used if the longer radius template does not clear all obstacles. The minimum radius templates demonstrate the tightest turn that the vehicles can navigate, assuming a speed of less than 10 miles per hour.

For offtracking lane width requirements on freeway ramps, see Topic 504.

### 404.3 Design Tools

District Truck Managers should be consulted early in the project to ensure compliance with the design vehicle guidance contained in Topic 404. Consult local agencies to verify the location of local truck routes. Essentially, two options are available – templates or computer software.

- The turning templates in Figures 404.5A through G are a design aid for determining the swept width and/or tracking width of large vehicles as they maneuver through a turn. The templates can be used as overlays to evaluate the adequacy of the geometric layout of a curve or intersection when reproduced on clear film and scaled to match the highway drawings. These templates assume a vehicle speed of less than 10 miles per hour.

- Computer software such as AutoTURN or AutoTrak can draw the swept width and/or tracking width along any design curve within a CADD drawing program such as MicroStation or AutoCAD. Dimensions taken from the vehicle diagrams in Figures 404.5A through G may be inputted into the computer program by creating a custom vehicle if the vehicle is not already included in the software library. The software can also create a vehicle turn template that conforms to any degree curve desired.

#### 404.4 Design Vehicles and Related Definitions

(1) *The Surface Transportation Assistance Act of 1982 (STAA).*

- STAA Routes. STAA allows certain longer trucks called STAA trucks to operate on the National Network. After STAA was enacted, the Department evaluated State routes for STAA truck access and created Terminal Access and Service Access routes which, together with the National Network, are called the STAA Network. Terminal Access routes allow STAA access to terminals and facilities. Service Access routes allow STAA trucks one-mile access off the National Network, but only at identified exits and only for designated services. Service Access routes are primarily local roads. A “Truck Route Map,” indicating the National Network routes and the Terminal Access routes is posted on the Department’s Office of Commercial Vehicle Operations website and is also available in printed form.
- STAA Design Vehicle. The STAA design vehicle is a truck tractor-semitrailer combination with a 48-foot semitrailer, a 43-foot kingpin-to-rear-axle (KPR) distance, an 8.5-foot body and axle width, and a 23-foot truck tractor wheelbase. Note, a truck tractor is a non-load-carrying vehicle. There is also a STAA double (truck tractor-semitrailer-trailer); however, the double is not used as the design vehicle due to its shorter turning radius. The STAA Design Vehicle is shown in Figures 404.5A and B.

The STAA Design Vehicle in Figures 404.5A or B should be used on the National Network, Terminal Access, California Legal, and Advisory routes.

- STAA Vehicle – 53-Foot Trailer. Another category of vehicle allowed only on STAA routes has a maximum 53-foot trailer, a maximum 40-foot KPR for two or more axles, a maximum 38-foot KPR for a single axle, and unlimited overall length. This vehicle is not to be used as the design vehicle as it is not the worst case for offtracking due to its shorter KPR. The STAA Design Vehicle should be used instead.
- (2) *California Legal.*
- California Legal Routes. Virtually all State routes off the STAA Network are California Legal routes. There are two types of California Legal routes, the regular California Legal routes and the KPR Advisory Routes. Advisory routes have signs posted that state the maximum KPR length that the route can accommodate without the vehicle offtracking outside the lane. KPR advisories range from 30 feet to 38 feet, in 2-foot increments. California Legal vehicles are allowed to use both types of California Legal routes. California Legal vehicles can also use the STAA Network. However, STAA trucks are not allowed on any California Legal routes. The Truck Route Map indicating the California Legal routes is posted on the Department’s Office of Commercial Vehicle Operations website.
  - California Legal Design Vehicle. The California Legal vehicle is a truck tractor-semitrailer with the following dimensions: the maximum overall length is 65 feet; the maximum KPR distance is 40 feet for semitrailers with two or more axles, and 38 feet for semitrailers with a single axle; the maximum width is 8.5 feet. There are also two categories of California Legal doubles (truck tractor-semitrailer-trailer); however, the doubles are not used as the design vehicle due to their shorter turning radii. The California Legal Design Vehicle is shown in Figures 404.5C and D.

The California Legal Design Vehicle in Figures 404.5C and D should only be used when the STAA design vehicle is not feasible and with concurrence from the District Truck Manager.

(3) *40-Foot Bus.*

- (a) 40-Foot Bus Routes. All single-unit vehicles, including buses and motor trucks up to 40 feet in length, are allowed on virtually every route in California.
- (b) 40-Foot Bus Design Vehicle. The 40-Foot Bus Design Vehicle shown in Figure 404.5E is an AASHTO standard. Its 25-foot wheelbase and 40-foot length are typical of city transit buses and some intercity buses. At intersections where truck volumes are light or where the predominate truck traffic consists of mostly 3-axle units, the 40-foot bus may be used. Its wheel path sweeps a greater width than 3-axle delivery trucks, as well as smaller buses such as school buses.

(4) *45-Foot Bus & Motorhome.*

- (a) 45-Foot Bus & Motorhome Routes. The “45-foot bus and motorhome” refers to bus and motorhomes over 40 feet in length, up to and including 45 feet in length. These longer buses and motorhomes are allowed in California, but only on certain routes.

The 45-foot tour bus became legal on the National Network in 1991 and later allowed on some State routes in 1995. The 45-foot motorhome became legal in California in 2001, but only on those routes where the 45-foot bus was already allowed. A Bus and Motorhome Map indicating where these longer buses and motorhomes are allowed and where they are not allowed is posted on the Department’s Office of Commercial Vehicle Operations website.

- (b) 45-Foot Bus and Motorhome Design Vehicle. The 45-Foot Bus & Motorhome Design Vehicle shown in Figure 404.5F is used by Caltrans for the longest allowable bus and motorhome. Its wheelbase is 28.5 feet. It is also similar to the AASHTO standard 45-foot bus. Typically this should

be the smallest design vehicle used on a State highway. It may be used where the State highway intersects local streets without commercial or industrial traffic.

The 45-Foot Bus and Motorhome Design Vehicle shown in Figure 404.5F should be used in the design of all interchanges and intersections on all green routes indicated on the Bus and Motorhome Map for both new construction and rehabilitation projects. Check also the longer standard design vehicles on these routes as required – the STAA Design Vehicle and the California Legal Design Vehicle in Indexes 404.4(1) and (2).

(5) *60-Foot Articulated Bus.*

- (a) 60-Foot Articulated Bus Routes. The articulated bus is allowed a length of up to 60 feet per CVC 35400(b)(3)(A). This bus is used primarily by local transit agencies for public transportation. There is no master listing of such routes. Local transit agencies should be contacted to determine possible routes within the proposed project.
- (b) 60-Foot Articulated Bus Design Vehicle. The 60-Foot Articulated Bus Design Vehicle shown in Figure 404.5G is an AASHTO standard. The routes served by these buses should be designed to accommodate the 60-Foot Articulated Bus Design Vehicle.

### 404.5 Turning Templates & Vehicle Diagrams

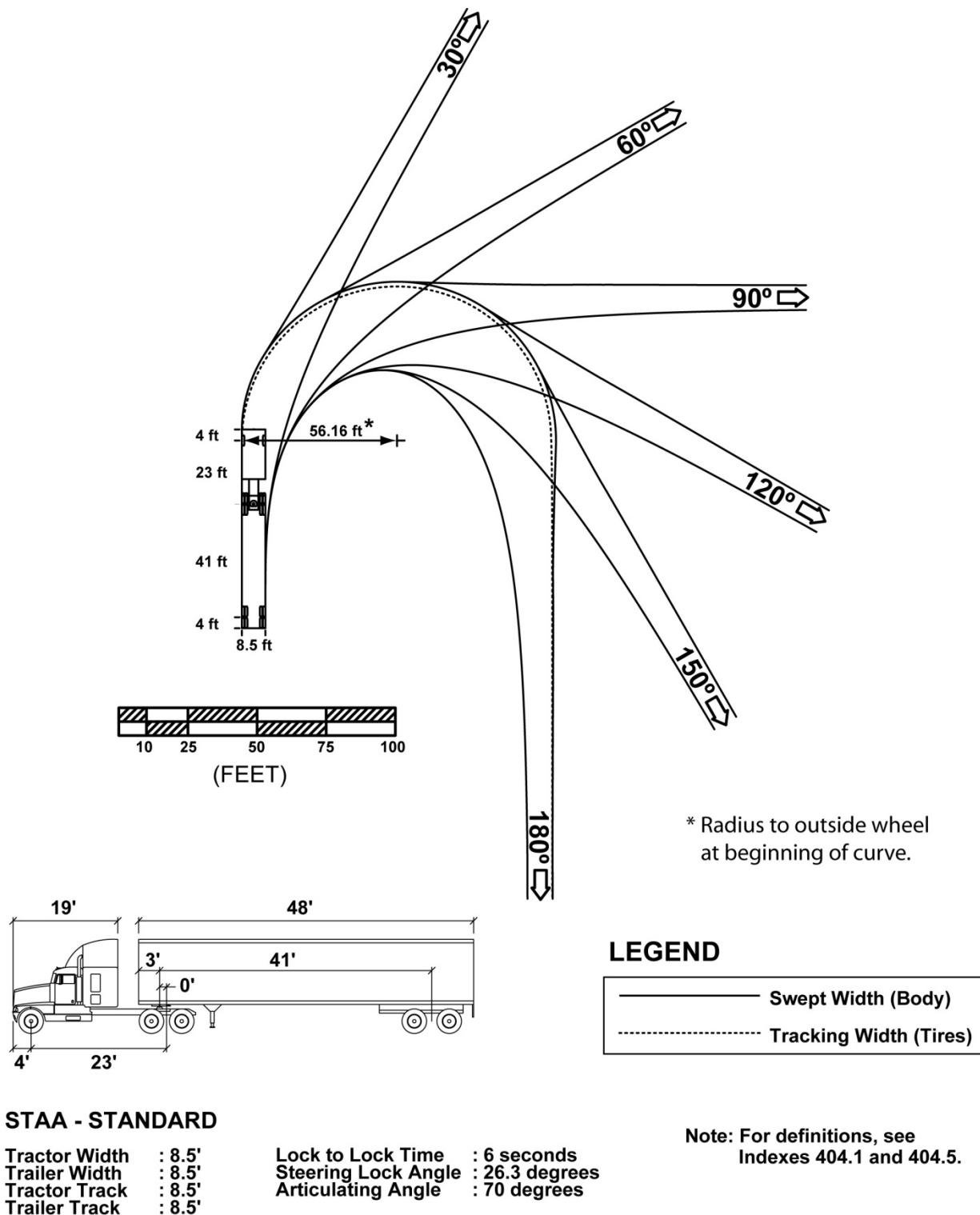
Figures 404.5A through G are computer-generated turning templates at an approximate scale of 1"=50' and their associated vehicle diagrams for the design vehicles described in Index 404.3. The radius of the template is measured to the outside front wheel path at the beginning of the curve. Figures 404.5A through G contain the terms defined as follows:

- (1) *Tractor Width* - Width of tractor body.
- (2) *Trailer Width* - Width of semitrailer body.
- (3) *Tractor Track* - Tractor axle width, measured from outside face of tires.

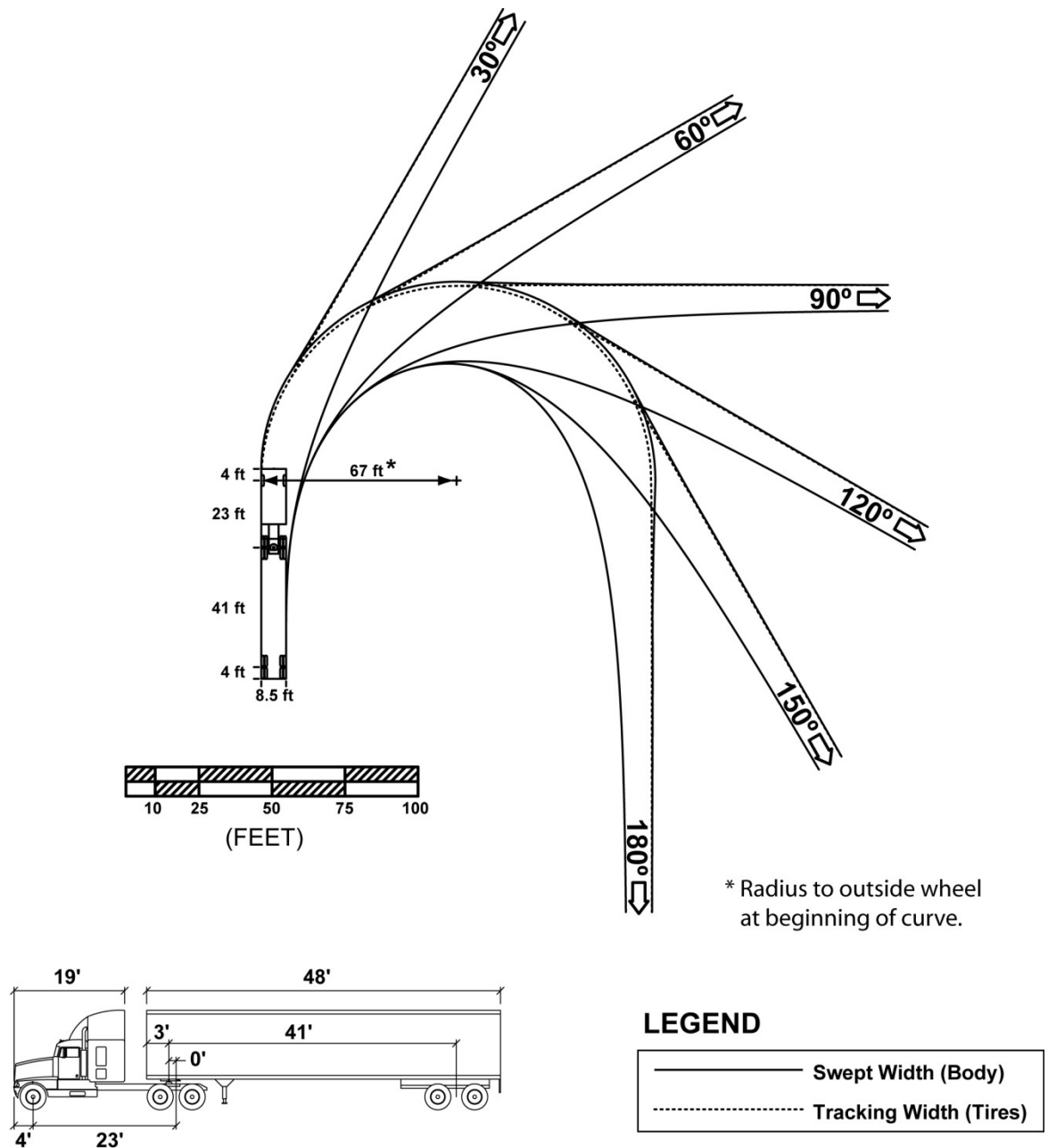


December 14, 2018

**Figure 404.5A**  
**STAA Design Vehicle**  
**56-Foot Radius**



**Figure 404.5B**  
**STAA Design Vehicle**  
**67-Foot Radius**



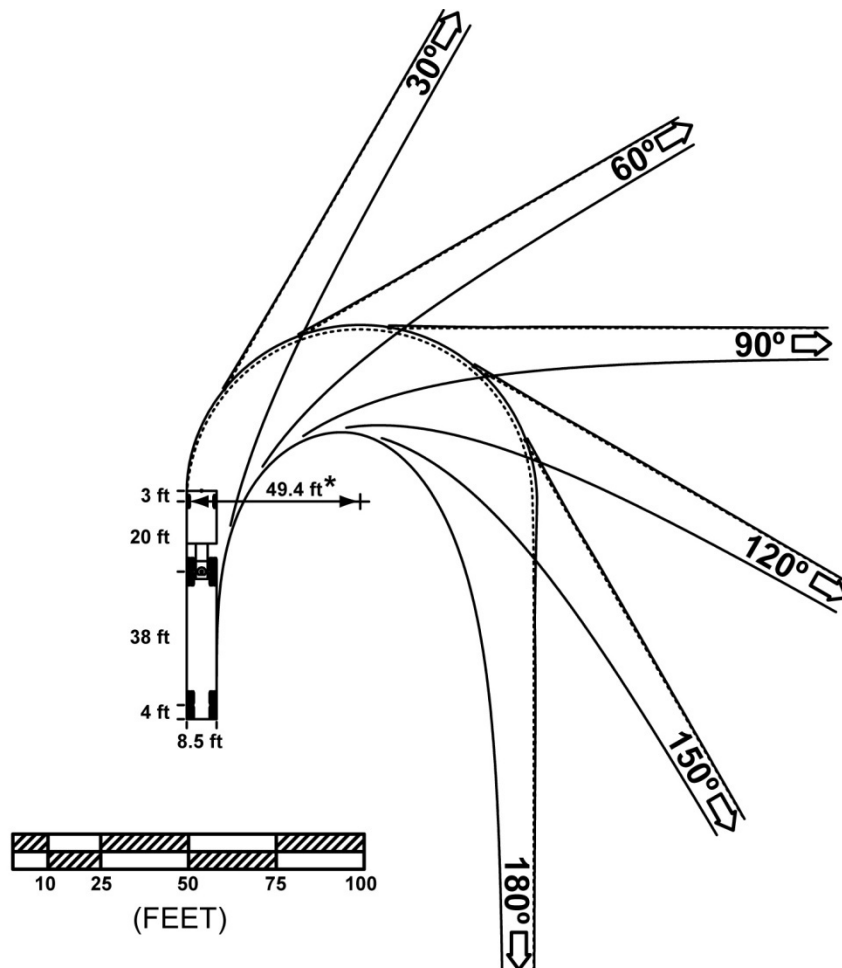
**STAA - STANDARD**

Tractor Width : 8.5'  
 Trailer Width : 8.5'  
 Tractor Track : 8.5'  
 Trailer Track : 8.5'

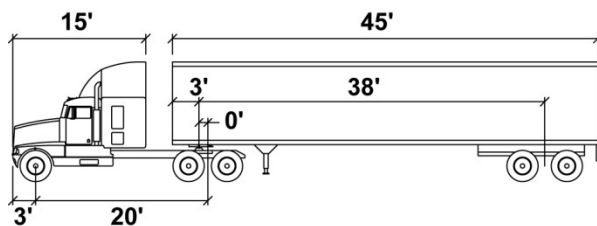
Lock to Lock Time : 6 seconds  
 Steering Lock Angle : 26.3 degrees  
 Articulating Angle : 70 degrees

Note: For definitions, see  
 Indexes 404.1 and 404.5.

**Figure 404.5C**  
**California Legal Design Vehicle**  
**50-Foot Radius**



\* Radius to outside wheel  
at beginning of curve.



### LEGEND

|  |                        |
|--|------------------------|
|  | Swept Width (Body)     |
|  | Tracking Width (Tires) |

### CA LEGAL - 65 FT

|               |        |                     |                |
|---------------|--------|---------------------|----------------|
| Tractor Width | : 8.5' | Lock to Lock Time   | : 6 seconds    |
| Trailer Width | : 8.5' | Steering Lock Angle | : 26.3 degrees |
| Tractor Track | : 8.5' | Articulating Angle  | : 70 degrees   |
| Trailer Track | : 8.5' |                     |                |

Note: For definitions, see  
Indexes 404.1 and 404.5.

**Figure 404.5D**  
**California Legal Design Vehicle**  
**60-Foot Radius**

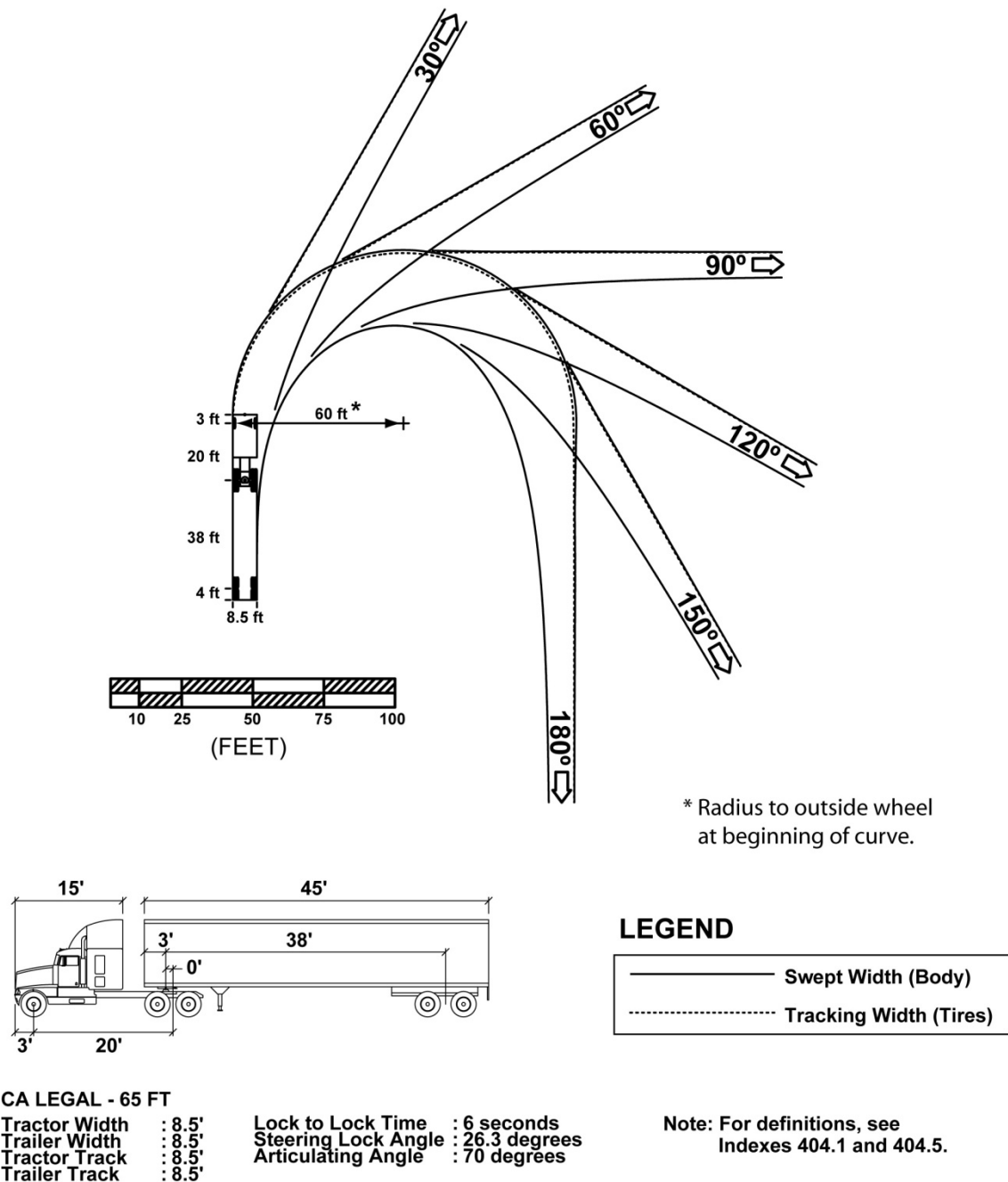
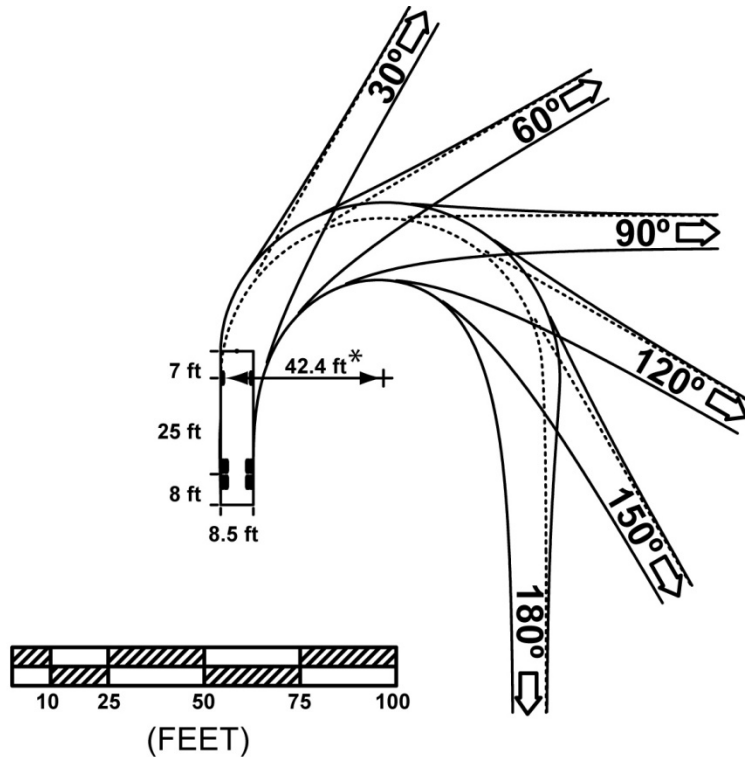
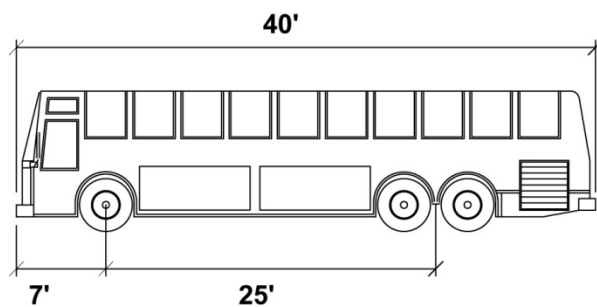


Figure 404.5E

## 40-Foot Bus Design Vehicle



\* Radius to outside wheel  
at beginning of curve.



## LEGEND

|       |                        |
|-------|------------------------|
| ————— | Swept Width (Body)     |
| ----- | Tracking Width (Tires) |

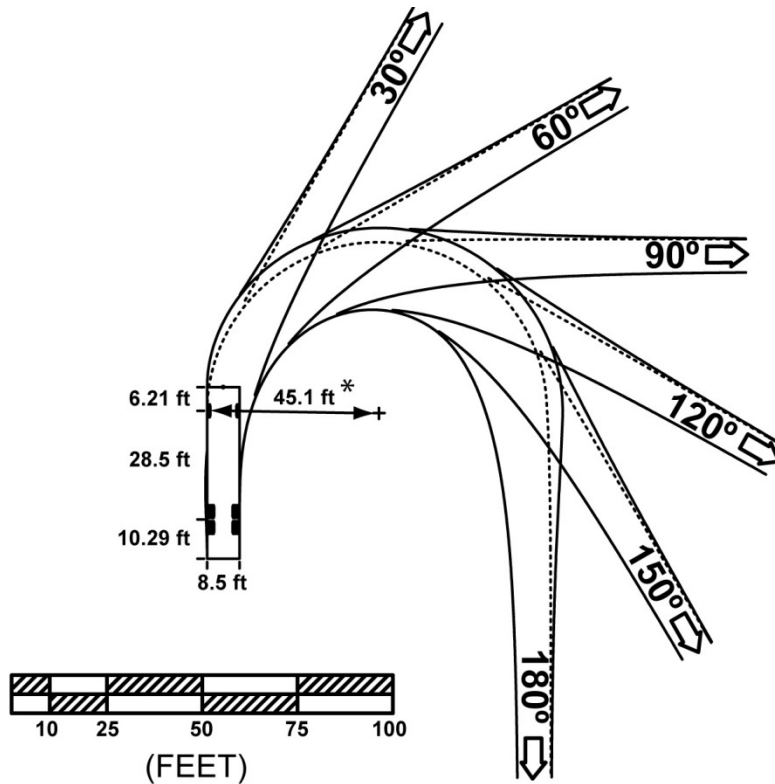
## 40' BUS

Width : 8.5'  
 Track : 8.5'  
 Lock to Lock Time : 6 seconds  
 Steering Lock Angle: 41.0 degrees

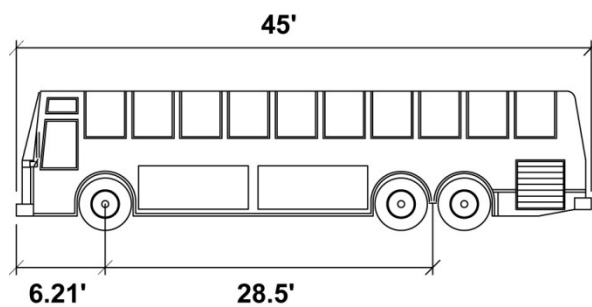
Note: For definitions, see  
Indexes 404.1 and 404.5.

Figure 404.5F

## 45-Foot Bus &amp; Motorhome Design Vehicle



\* Radius to outside wheel  
at beginning of curve.



## LEGEND

|       |                        |
|-------|------------------------|
| ————— | Swept Width (Body)     |
| ----- | Tracking Width (Tires) |

## 45' BUS

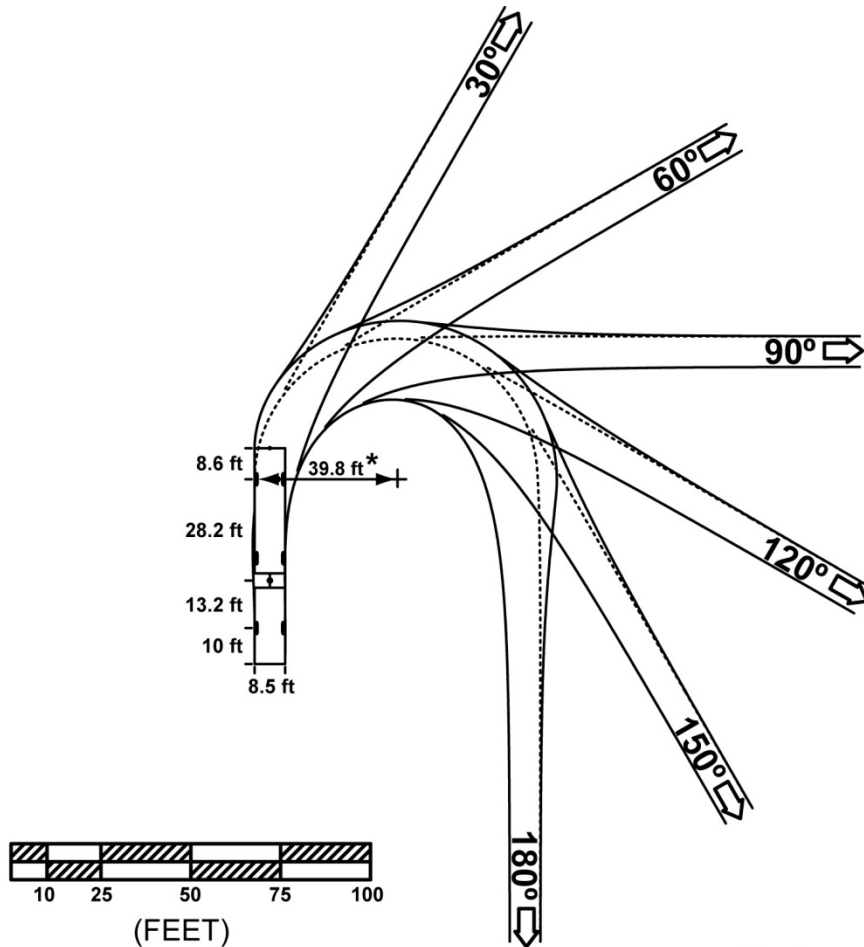
Width : 8.5'  
 Track : 8.5'  
 Lock to Lock Time : 6 seconds  
 Steering Lock Angle: 44.3 degrees

Note: For definitions, see  
Indexes 404.1, and 404.5.



Figure 404.5G

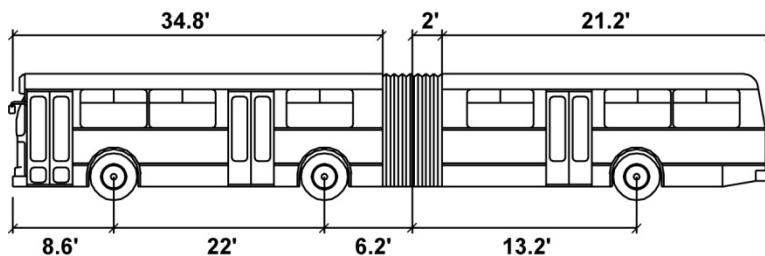
## 60-Foot Articulated Bus Design Vehicle



\* Radius to outside wheel  
at beginning of curve.

## LEGEND

|  |                        |
|--|------------------------|
|  | Swept Width (Body)     |
|  | Tracking Width (Tires) |



## ARTICULATED BUS

|                     |                |
|---------------------|----------------|
| Width               | : 8.5'         |
| Track               | : 8.5'         |
| Lock to Lock Time   | : 6 seconds    |
| Steering Lock Angle | : 38.3 degrees |
| Articulating Angle  | : 50.0 degrees |

Note: For definitions, see  
Indexes 404.1 and 404.5.

- (4) *Trailer Track* – Semitrailer axle width, measured from outside face of tires.
- (5) *Lock To Lock Time* - The time in seconds that an average driver would take under normal driving conditions to turn the steering wheel of a vehicle from the lock position on one side to the lock position on the other side. The default in AutoTurn software is 6 seconds.
- (6) *Steering Lock Angle* - The maximum angle that the steering wheels can be turned. It is further defined as the average of the maximum angles made by the left and right steering wheels with the longitudinal axis of the vehicle.
- (7) *Articulating Angle* - The maximum angle between the tractor and semitrailer.

## Topic 405 - Intersection Design Standards

### 405.1 Sight Distance

- (1) *Stopping Sight Distance*. See Index 201.1 for minimum stopping sight distance requirements.
- (2) *Corner Sight Distance*.

- (a) General--At unsignalized intersections a substantially clear line of sight should be maintained between the driver of a vehicle, bicyclist or pedestrian stopped on the minor road and the driver of an approaching vehicle on the major road that has no stop. Line of sight for all users should be included in right of way, in order to preserve sight lines.

Adequate time should be provided for the stopped vehicle on the minor road to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right, without requiring through traffic to radically alter their speed. The visibility required for these maneuvers form a clear sight triangle with the corner sight distance  $b$  and the crossing distance  $a_1$  or  $a_2$  (see Figure 405.1 as an example of corner sight distance at a two-lane, two-way highway). Dimensions  $a_1$  and  $a_2$  are measured from the decision point to the center of the lane. The actual number of lanes will vary on the major and minor roads. There should be no

sight obstruction within the clear sight triangle.

The methodology used for the driver on the minor road that is stopped to complete the necessary maneuver while the approaching vehicle travels at the design speed of the major road is based on gap-acceptance behavior. A 7-1/2 second criterion is applied to a passenger car (including pickup trucks) for a left turn from a stop on the minor road. However, this time gap does not account for a single-unit truck (no semitrailer), a combination truck (see Index 404.4 for truck tractor-semi-trailer guidance), a right-turn from a stop, or for a crossing maneuver. See Table 405.1A for the time gap that addresses these situations for the assumed design vehicle making these maneuvers from the minor road.

In determining corner sight distance, a set back distance for the vehicle waiting on the minor road must be assumed as measured from the edge of traveled way of the major road. Set back for the driver of the vehicle on the minor road should be a minimum of 10 feet plus the shoulder width of the major road but not less than 15 feet. The location of the driver's eye for the set back is the decision point per Figure 405.1. Corner sight distance and the driver's eye set back are also illustrated in Figures 405.7 and 504.3I. Line of sight for corner sight distance for passenger cars is to be determined from a 3 and 1/2-foot height at the location of the driver of the vehicle in the center of the minor road lane to a 3 and 1/2-foot object height in the center of the approaching outside lane of the major road. This provides for reciprocal sight by both vehicles. The passenger car driver's eye height should be applied to all minor roads. In addition, a truck driver's eye height of 7.6 feet should be applied to the minor road where applicable. Additionally, if the major road has a median barrier, a 2-foot object height should be used to determine the median barrier set back. A median that is wide enough to accommodate a stopped vehicle should also provide a clear sight triangle.

The minimum corner sight distance (feet) should be determined by the equation:  $1.47V_mT_g$ , where  $V_m$  is the design speed (mph) of the major road and  $T_g$  is the time gap (seconds) for the minor road vehicle to enter the major road. The values given in Table 405.1A should be used to determine  $T_g$  based on the design vehicle, the type of maneuver, and whether the stopped vehicle's rear wheels are on an upgrade exceeding 3 percent. The distance from the edge of traveled way to the rear wheels at the minor road stop location should be assumed as: 20 feet for a passenger car, 30 feet for a single-unit truck, and 72 feet for a combination truck.

- (b) Public Road Intersections (Refer to Topic 205)--At unsignalized public road intersections (see Index 405.7) corner sight distance applies.

At signalized intersections the corner sight distances should also be applied whenever possible. Even though traffic flows are designed to move at separate times, unanticipated conflicts can occur due to violation of signal, right turns on red, malfunction of the signal, or use of flashing red/yellow mode.

The minimum value for corner sight distance at signalized intersections should be equal to the stopping sight distance as given in Table 201.1, measured as previously described. This includes an urban driveway that forms a leg of the signalized intersection.

- (c) Private Road Intersections (Refer to Index 205.2) and Rural Driveways (Refer to Index 205.4)--The minimum corner sight distance should be equal to the stopping sight distance as given in Table 201.1, measured as previously described.
- (d) Urban Driveways (Refer to Index 205.3)--Corner sight distance requirements as described above are not applied to urban driveways. If parking is allowed on the major road, parking should be prohibited on

both sides of the driveway per the California MUTCD, 3B.19.

- (3) *Decision Sight Distance.* At intersections where the State route turns or crosses another State route, the decision sight distance values given in Table 201.7 should be used. In computing and measuring decision sight distance, the 3.5-foot eye height and the 0.5-foot object height should be used, the object being located on the side of the intersection nearest the approaching driver.

The application of the various sight distance requirements for the different types of intersections is summarized in Table 405.1B.

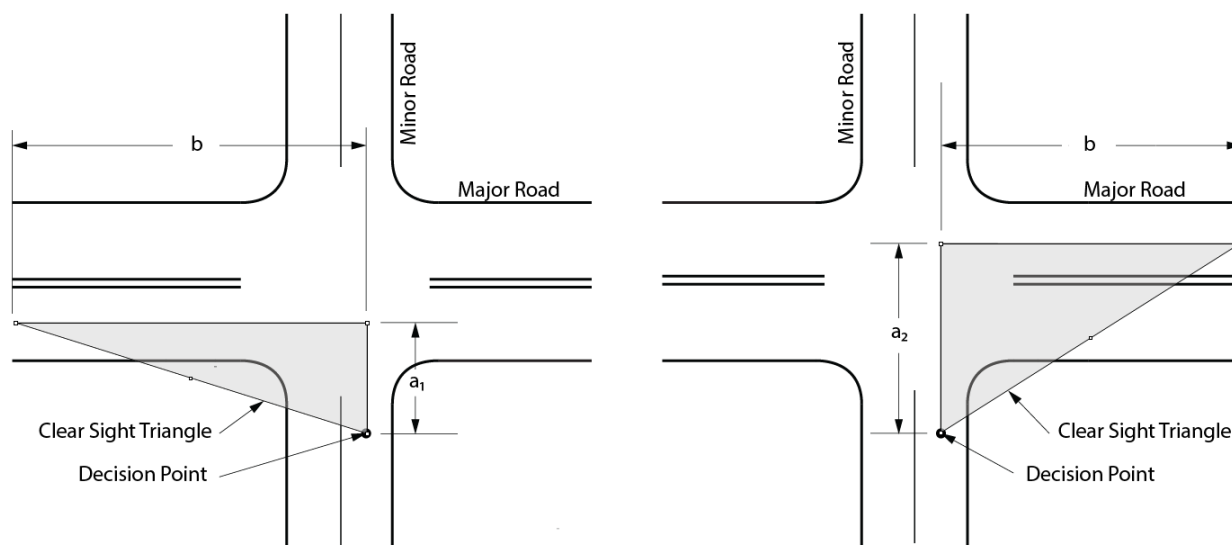
**Table 405.1B**  
**Application of Sight Distance Requirements**

| Intersection Types                                                           | Sight Distance |                  |          |
|------------------------------------------------------------------------------|----------------|------------------|----------|
|                                                                              | Stopping       | Corner           | Decision |
| Private Roads                                                                | X              | X <sup>(1)</sup> |          |
| Public Streets and Roads                                                     | X              | X                |          |
| Signalized Intersections                                                     | X              | X <sup>(2)</sup> |          |
| State Route Intersections & Route Direction Changes, with or without Signals | X              | X                | X        |

NOTES:

- (1) Per Index 405.1(2)(c), the minimum corner sight distance shall be equal to the stopping sight distance as given in Table 201.1. See Index 405.1(2)(a) for setback requirements.
- (2) Apply corner sight distance requirements at signalized intersections whenever possible due to unanticipated violations of the signals or malfunctions of the signals. See Index 405.1(2)(b).
- (4) *Acceleration Lanes for Turning Moves onto State Highways.* At rural intersections, with "STOP" control on the local cross road, acceleration lanes for left and right turns onto the State facility should be considered. At a minimum, the following features should be

**Figure 405.1**  
**Corner Sight Distance**



**Table 405.1A**  
**Corner Sight Distance Time Gap ( $T_g$ )**  
**for Unsignalized Intersections**

| Design Vehicle                   | Left-turn from Stop (s) | Right-turn from Stop and Crossing Maneuver (s) |
|----------------------------------|-------------------------|------------------------------------------------|
| <b>Passenger Car</b>             | 7½                      | 6½                                             |
| Private Road Intersection        |                         |                                                |
| Rural Driveway                   |                         |                                                |
| <b>Single-Unit Truck</b>         | 9½                      | 8½                                             |
| Public Road Intersection         |                         |                                                |
| <b>Combination Truck</b>         | 11½                     | 10½                                            |
| Major and Minor Roads on Routes: |                         |                                                |
| National Network                 |                         |                                                |
| Terminal or Service Access       |                         |                                                |
| California Legal                 |                         |                                                |
| KPRA Advisory                    |                         |                                                |

Notes: Time gaps are for a stopped vehicle to turn left, right or cross a two-lane highway with no median and with minor road grades of 3 percent or less. The table values should be adjusted as follows:

- (1) For multilane highways—When crossing or making a left-turn onto a two-way major road with more than two lanes, add 0.5 s for passenger cars or 0.7 s for trucks for each additional lane to be crossed. Median widths should be converted to an equivalent number of lanes in applying the 0.5 s and 0.7 s criteria. For example, an 18-foot wide median is equivalent to 1.5 lanes; this requires an additional 0.75 s for a passenger car to cross or an additional 1.05 s for a truck to cross.
- (2) For minor road approach grades—If the minor road approach grade is an upgrade that exceeds 3 percent and the rear wheels of the design vehicle are on the grade exceeding 3 percent, add 0.2 s for each percent grade for left-turns; or add 0.1 s for each percent grade for right-turns and crossing maneuvers. For example, a passenger car is turning right from a minor road and at the stop location its rear wheels are on a 4 percent upgrade; this requires an additional 0.4 s for the right-turn.
- (3) Unique situations may necessitate a different design vehicle for a particular minor road than those listed here (e.g., predominant combination trucks out of a rural driveway). Additionally, for intersections at skewed angles less than 60 degrees, a further adjustment is needed. See the AASHTO “A Policy on Geometric Design of Highways and Streets” for guidance.

evaluated for both the major highway and the cross road:

- divided versus undivided
- number of lanes
- design speed
- gradient
- lane, shoulder and median width
- traffic volume and composition of highway users, including trucks and transit vehicles
- turning volumes
- horizontal curve radii
- sight distance
- proximity of adjacent intersections
- types of adjacent intersections

For additional information and guidance, refer to AASHTO, A Policy on Geometric Design of Highways and Streets, the District Traffic Engineer or designee, the District Design Liaison, and the Project Delivery Coordinator.

## 405.2 Left-turn Channelization

- (1) *General.* The purpose of a left-turn lane is to expedite the movement of through traffic by, controlling the movement of turning traffic, increasing the capacity of the intersection, and improving safety characteristics.

The District Traffic Branch normally establishes the need for left-turn lanes.

- (2) *Design Elements.*

- (a) Lane Width – **The lane width for both single and double left-turn lanes on State highways shall be 12 feet.**

**For conventional State highways with posted speeds less than or equal to 40 miles per hour and AADTT (truck volume) less than 250 per lane that are in urban, city or town centers (rural main streets), the minimum lane width shall be 11 feet.**

When considering lane width reductions adjacent to curbed medians, refer to Index

303.5 for guidance on effective roadway width, which may vary depending on drivers' lateral positioning and shy distance from raised curbs.

- (b) Approach Taper -- On conventional highways without a median, an approach taper provides space for a left-turn lane by moving traffic laterally to the right. The approach taper is unnecessary where a median is available for the full width of the left-turn lane. Length of the approach taper is given by the formula on Figures 405.2A, B and C.

Figure 405.2A shows a standard left-turn channelization design in which all widening is to the right of approaching traffic and the deceleration lane (see below) begins at the end of the approach taper. This design should be used in all situations where space is available, usually in rural and semi-rural areas or in urban areas with high traffic speeds and/or volumes.

Figures 405.2B and 405.2C show alternate designs foreshortened with the deceleration lane beginning at the 2/3 point of the approach taper so that part of the deceleration takes place in the through traffic lane. Figure 405.2C is shortened further by widening half (or other appropriate fraction) on each side. These designs may be used in urban areas where constraints exist, speeds are moderate and traffic volumes are relatively low.

- (c) Bay Taper -- A reversing curve along the left edge of the traveled way directs traffic into the left-turn lane. The length of this bay taper should be short to clearly delineate the left-turn move and to discourage through traffic from drifting into the left-turn lane. Table 405.2A gives offset data for design of bay tapers. In urban areas, lengths of 60 feet and 90 feet are normally used. Where space is restricted and speeds are low, a 60-foot bay taper is appropriate. On rural high-speed highways, a 120-foot length is considered appropriate.
- (d) Deceleration Lane Length -- Design speed of the roadway approaching the intersection

should be the basis for determining deceleration lane length. It is desirable that deceleration take place entirely off the through traffic lanes. Deceleration lane lengths are given in Table 405.2B; the bay taper length is included. Where partial deceleration is permitted on the through lanes, as in Figures 405.2B and 405.2C, design speeds in Table 405.2B may be reduced

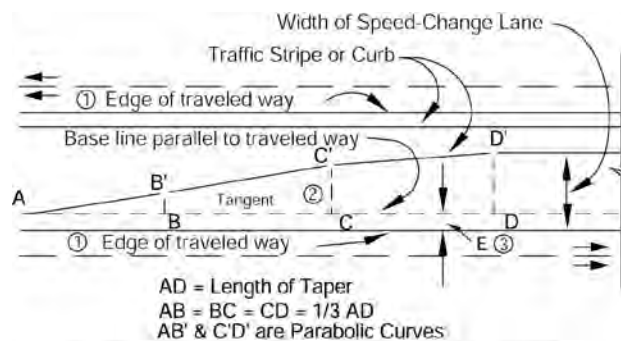
10 miles per hour to 20 miles per hour for a lower entry speed. In urban areas where cross streets are closely spaced and deceleration lengths cannot be achieved, the District Traffic branch should be consulted for guidance.

- (e) **Storage Length** -- At unsignalized intersections, storage length may be based on the number of turning vehicles likely to arrive in an average 2-minute period during the peak hour. At a minimum, space for 2 vehicles should be provided at 25 feet per vehicle. If the peak hour truck traffic is 10 percent or more, space for at least one passenger car and one truck should be provided. Bus usage may require a longer storage length and should be evaluated if their use is anticipated.

At signalized intersections, the storage length may be based on one and one-half to two times the average number of vehicles that would store per signal cycle depending on cycle length, signal phasing, and arrival and departure rates. At a minimum, storage length should be calculated in the same manner as unsignalized intersection. The District Traffic Branch should be consulted for this information.

When determining storage length, the end of the left-turn lane is typically placed at least 3 feet, but not more than 30 feet, from the nearest edge of shoulder of the intersecting roadway. Although often set by the placement of a crosswalk line or limit line, the end of the storage lane should always be located so that the appropriate turning template can be accommodated.

**Table 405.2A**  
**Bay Taper for Median**  
**Speed-change Lanes**



| LENGTH OF<br>TAPER - feet |      |       |
|---------------------------|------|-------|
| 60                        | 90   | 120   |
| Distance From Point "A"   |      |       |
| 5                         | 7.5  | 10.0  |
| 10                        | 15.0 | 20.0  |
| 15                        | 22.5 | 30.0  |
| 20                        | 30.0 | 40.0  |
| 30                        | 45.0 | 60.0  |
| 40                        | 60.0 | 80.0  |
| 45                        | 67.5 | 90.0  |
| 50                        | 75.0 | 100.0 |
| 55                        | 82.5 | 110.0 |
| 60                        | 90.0 | 120.0 |

| OFFSET<br>DISTANCE |              |              |
|--------------------|--------------|--------------|
| DD' =<br>10'       | DD' =<br>11' | DD' =<br>12' |
| 0.00               | 0.00         | 0.00         |
| 0.16               | 0.17         | 0.19         |
| 0.62               | 0.69         | 0.75         |
| 1.41               | 1.55         | 1.69         |
| 2.50               | 2.75         | 3.00         |
| 5.00               | 5.50         | 6.00         |
| 7.50               | 8.25         | 9.00         |
| 8.59               | 9.45         | 10.31        |
| 9.38               | 10.31        | 11.25        |
| 9.84               | 10.83        | 11.81        |
| 10.00              | 11.00        | 12.00        |

**NOTES:**

- (1) The table gives offsets from a base line parallel to the edge of traveled way at intervals measured from point "A". Add "E" for measurements from edge of traveled way.
- (2) Where edge of traveled way is a curve, neither base line nor taper between B & C will be a tangent. Use proportional offsets from B to C.
- (3) The offset "E" is usually 2 ft along edge of traveled way for curbed medians; Use "E" = 0 ft. for striped medians.

**Table 405.2B**  
**Deceleration Lane Length**

| Design Speed<br>(mph) | Length to<br>Stop (ft) |
|-----------------------|------------------------|
| 30                    | 235                    |
| 40                    | 315                    |
| 50                    | 435                    |
| 60                    | 530                    |



- (3) *Double Left-turn Lanes.* At signalized intersections on multilane conventional highways and on multilane ramp terminals, double left-turn lanes should be considered if the left-turn demand is 300 vehicles per hour or more. The lane widths and other design elements of left-turn lanes given under Index 405.2(2) applies to double as well as single left-turn lanes.

The design of double left-turn lanes can be accomplished by adding one or two lanes in the median. See "Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians", published by Headquarters, Division of Traffic Operations, for the various treatments of double left-turn lanes.

- (4) *Two-way Left-turn Lane (TWLTL).* The TWLTL consists of a striped lane in the median of an arterial and is devised to address the special capacity and safety problems associated with high-density strip development. It can be used on 2-lane highways as well as multilane highways. Normally, the District Traffic Operations Branch should determine the need for a TWLTL.

**The minimum width for a TWLTL shall be 12 feet (see Index 301.1).** The preferred width is 14 feet. Wider TWLTL's are occasionally provided to conform with local agency standards. However, TWLTL's wider than 14 feet are not recommended, and in no case should the width of a TWLTL exceed 16 feet. Additional width may encourage drivers in opposite directions to use the TWLTL simultaneously.

### 405.3 Right-turn Channelization

- (1) *General.* For right-turning traffic, delays are less critical and conflicts less severe than for left-turning traffic. Nevertheless, right-turn lanes can be justified on the basis of capacity, analysis, and crash experience.

In rural areas a history of high speed rear-end collisions may warrant the addition of a right-turn lane.

In urban areas other factors may contribute to the need such as:

- High volumes of right-turning traffic causing backup and delay on the through lanes.
- Conflicts between crossing pedestrians and right-turning vehicles and bicycles.
- Frequent rear-end and sideswipe collisions involving right-turning vehicles.

Where right-turn channelization is proposed, lower speed right-turn lanes should be provided to reduce the likelihood of conflicts between vehicles, pedestrians, and bicyclists.

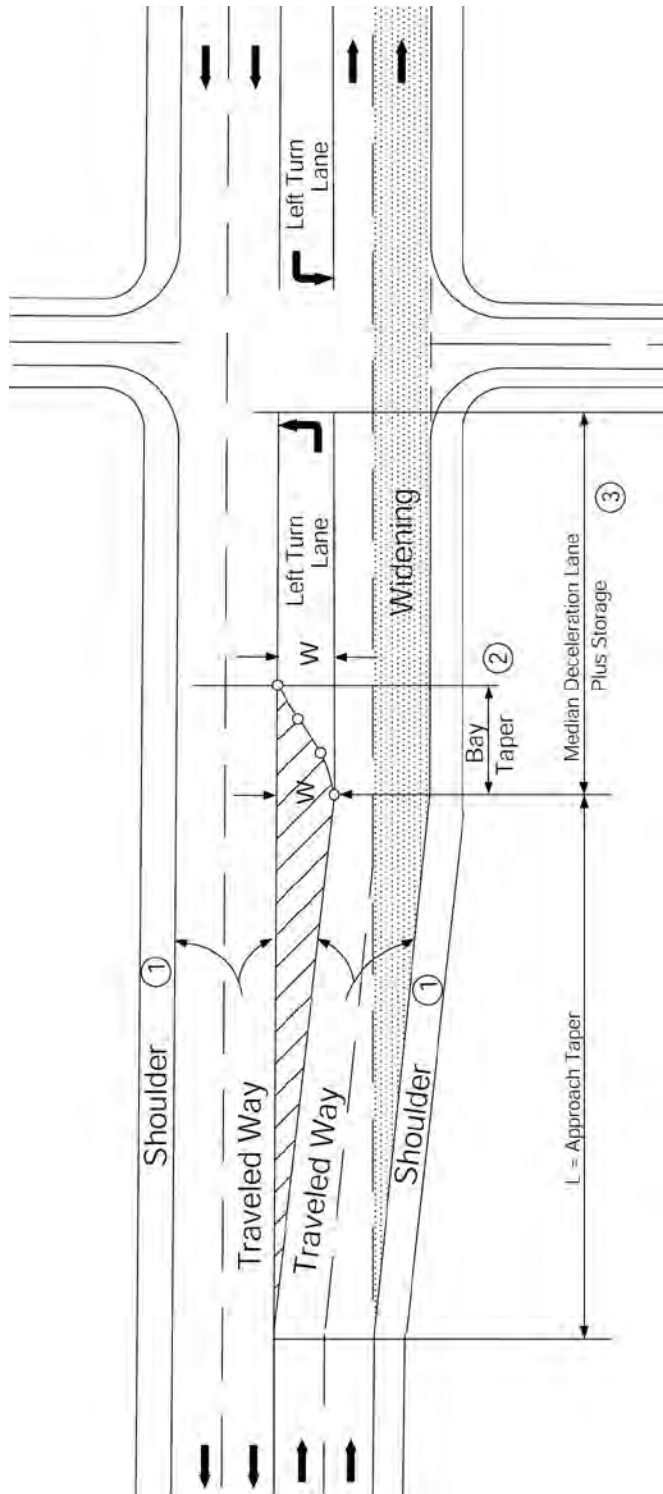
#### (2) *Design Elements.*

- (a) Lane and Shoulder Width--**Index 301.1 shall be used for right-turn lane width requirements. Shoulder width shall be a minimum of 4 feet.** Although not desirable, lane and shoulder widths less than those given above can be considered for right-turn lanes under the following conditions pursuant to Index 82.2:

- In urban, city or town centers (rural main streets) with posted speeds less than 40 miles per hour in severely constrained situations, if truck or bus use is low, consideration may be given to reducing the right-turn lane width to 10 feet.
- Shoulder widths may also be considered for reduction under constricted situations. Whenever possible, at least a 2-foot shoulder should be provided where the right-turn lane is adjacent to a curb. Entire omission of the shoulder should only be considered in constrained situations and where an 11-foot lane can be constructed.

Gutter pans can be included within a shoulder, but cannot be included as part of the travel lane width. Additional right of way for a future right-turn lane should be considered when an intersection is being designed.

**Figure 405.2A**  
**Standard Left-turn Channelization**



EQUATION:  $L = \text{Use } WV, \text{ for } V \geq 45 \text{ mph}^{(4)}$   
 Or  $WV^2/60, \text{ for } V < 45 \text{ mph}$

Where  $L$  = Length of Approach Taper - feet

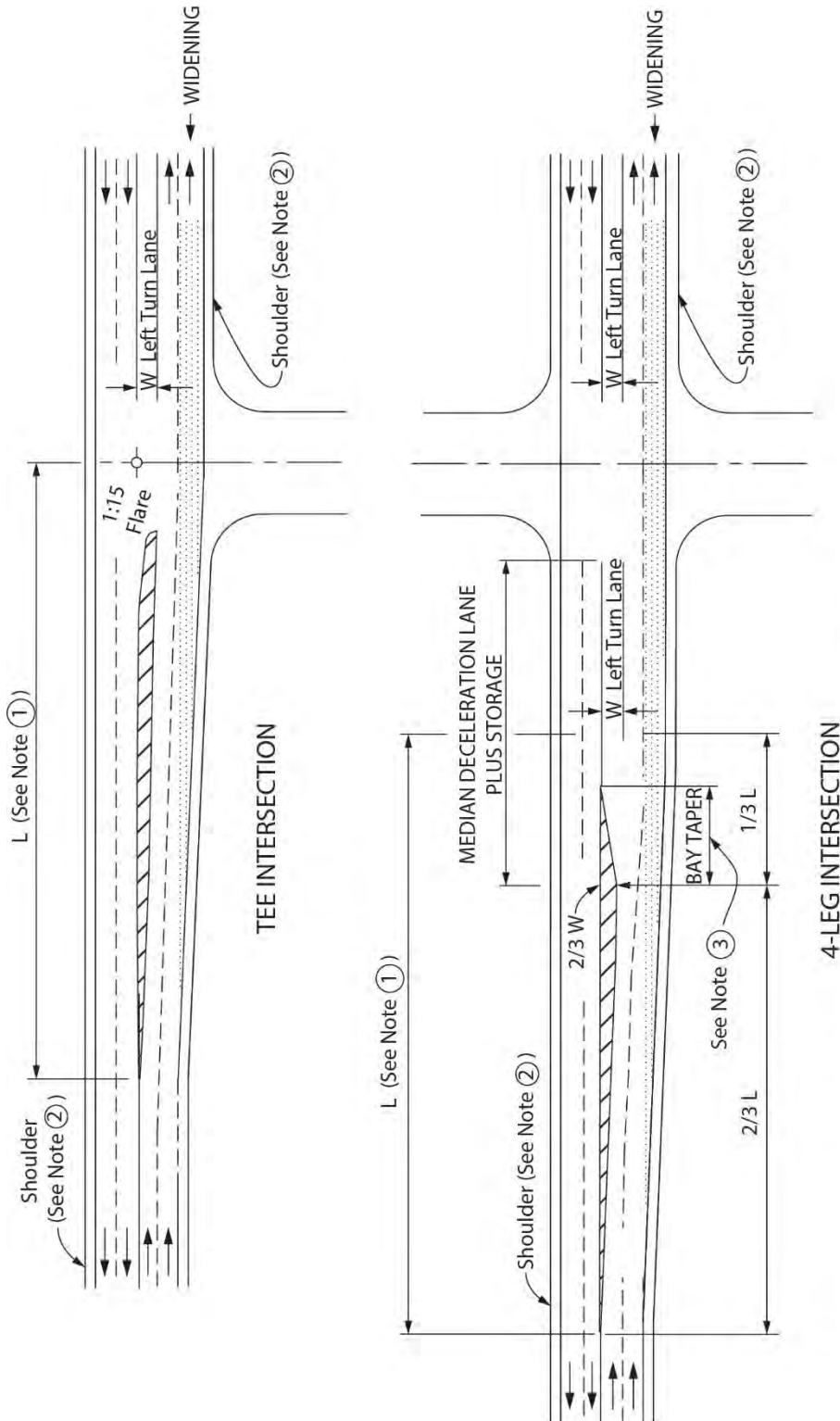
$V$  = Design Speed - mph

$W$  = Width of Median Lane - feet

**NOTES:**

- ① Where width is restricted, shoulder width may be reduced and parking restricted with an approved design exception pursuant to Index 82.2.  
For bicycle use, a minimum 4-foot shoulder is required (5-foot if gutter is present).
- ② Bay taper length = 60 feet to 120 feet. (See Table 405.2A)
- ③ For deceleration lane length see Table 405.2B.
- ④ Where both sides of roadway are widened, use a fraction of "W" that is proportional to widening on each side.

**Figure 405.2B**  
**Minimum Median Left-turn Channelization**  
**(Widening on one Side of Highway)**



#### EQUATION

Use  $WV$ , for  $V \geq 45 \text{ mph}$

$L = \text{Or } WV^2/60$ , for  $V < 45 \text{ mph}$

Where:

$L$  = Length of Transition - feet

$W$  = Width of Median Lane - feet

$V$  = Design Speed - mph

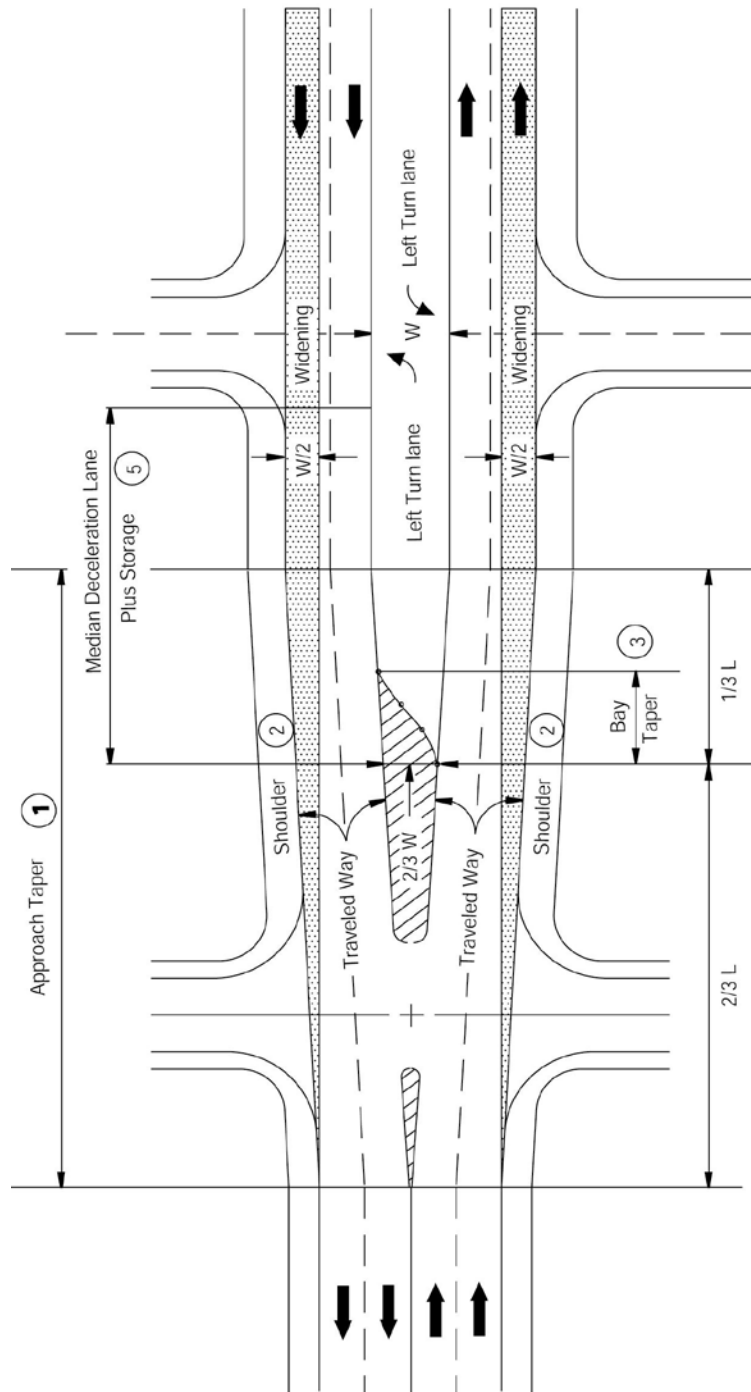
#### NOTES:

①  $L$  = 500 feet Maximum

② Where width is restricted, shoulder width may be reduced and parking restricted with an approved design exception pursuant to Index 82.2. For bicycle use, a minimum 4-foot shoulder is required (5-foot if gutter is required)

③ Bay Taper Length 60 feet to 120 feet (See Table 405.2A)

**Figure 405.2C**  
**Minimum Median Left-turn Channelization**  
**(Widening on Both Sides in Urban Areas with Short Blocks)**



**NOTES:**

- ① L = 500 feet Maximum
- ② Where width is restricted, shoulder width may be reduced and parking restricted with an approved design exception pursuant to Index 82.2. For bicycle use, a minimum 4 feet shoulder is required (5 feet if gutter is present).
- ③ Bay taper length = 60 feet to 120 feet. (See Table 405.2A)
- ④ Assumes equal widening each side. Where widening is unequal, use a fraction that is proportional to widening on each side.
- ⑤ For deceleration lane length see Table 405.2B.

**EQUATION: ④**

$$L = \begin{cases} \text{Use } (1/2)WV, & \text{for } V \geq 45\text{mph} \\ \text{Or } WV^2/120, & \text{for } V < 45\text{mph} \end{cases}$$

Where L = Length of Approach Taper - feet  
W = Width of Median Lane - feet  
V = Design Speed - mph

- (b) Curve Radius--Where pedestrians are allowed to cross a free right-turning roadway, the curve radius should be such that the operating speed of vehicular traffic is no more than 20 miles per hour at the pedestrian crossing. See NCHRP Report 672, "Roundabouts: An Informational Guide" for guidance on the determination of design speed (fastest path) for turning vehicles. See Index 504.3(3) for additional information.
- (c) Tapers--Approach tapers are usually unnecessary since main line traffic need not be shifted laterally to provide space for the right-turn lane. If, in some rare instances, a lateral shift were needed, the approach taper would use the same formula as for a left-turn lane.  
  
Bay tapers are treated as a mirror image of the left-turn bay taper.
- (d) Deceleration Lane Length--The conditions and principles of left-turn lane deceleration apply to right-turn deceleration. Where full deceleration is desired off the high-speed through lanes, the lengths in Table 405.2B should be used. Where partial deceleration is permitted on the through lanes because of limited right of way or other constraints, average running speeds in Table 405.2B may be reduced 10 miles per hour to 20 miles per hour for a lower entry speed. For example, if the main line speed is 50 miles per hour and a 10 miles per hour deceleration is permitted on the through lanes, the deceleration length may be that required for 40 miles per hour.
- (e) Storage Length--Right-turn storage length is determined in the same manner as left-turn storage length. See Index 405.2(2)(e).
- (3) *Right-turn Lanes at Off-ramp Intersections.* Diamond off-ramps with a free right-turn at the local street and separate right-turn off-ramps around the outside of a loop will likely cause conflict as traffic volumes increase. Serious conflicts occur when the right-turning vehicle must weave across multiple lanes on the local street in order to turn left at a major cross street close to the ramp terminal. Furthermore, free

right-turns create sight distance issues for pedestrians and bicyclists crossing the off-ramp, or pedestrians crossing the local road. Also, rear-end collisions can occur as right-turning drivers slow down or stop waiting for a gap in local street traffic. Free right-turns usually end up with "YIELD", "STOP", or signal controls thus defeating their purpose of increasing intersection capacity.

#### 405.4 Traffic Islands

A traffic island is an area between traffic lanes for channelization of bicycle and vehicle movements or for pedestrian refuge. An island may be defined by paint, raised pavement markers, curbs, pavement edge, or other devices. The California MUTCD should be referenced when considering the placement of traffic islands at signalized and unsignalized locations. For splitter island guidance at roundabouts, see Index 405.10(13).

Traffic islands usually serve more than one function. These functions may be:

- (a) Channelization to confine specific traffic movements into definite channels;
- (b) Divisional to separate traffic moving in the same or opposite direction; and
- (c) Refuge, to aid users crossing the roadway.

Generally, islands should present the least potential conflict to approaching or crossing bicycles and vehicles, and yet perform their intended function.

- (1) *Design of Traffic Islands.* Island sizes and shapes vary from one intersection to another. They should be large enough to command attention. Channelizing islands should not be less than 50 square feet in area, preferably 75 square feet. Curbed, elongated divisional median islands should not be less than 4 feet wide and 20 feet long. All traffic islands placed in the path of a pedestrian crossing must comply with DIB 82. See the Standard Plans for typical island passageway details.

The approach end of each island should be offset 3 feet to the left and 5 feet to the right of approaching traffic, using standard 1:15 parabolic flares, and clearly delineated so that it does not surprise the motorist or bicyclist. These offsets are in addition to the shoulder

widths shown in Table 302.1. Table 405.4 gives standard parabolic flares to be used in island design. On curved alignment, parabolic flares may be omitted for small triangular traffic islands whose sides are less than 25 feet long.

The approach nose of a divisional island should be highly visible day and night with appropriate use of signs (reflectorized or illuminated) and object markers. The approach nose should be offset 3 feet from the through traffic to minimize accidental impacts.

- (2) *Delineation of Traffic Islands.* Generally, islands should present the least potential conflict to approaching traffic and yet perform their intended function. See Index 303.2 for appropriate curb type. Islands may be designated as follows:

- (a) Raised paved areas outlined by curbs.
- (b) Flush paved areas outlined by pavement markings.
- (c) Unpaved areas (small unpaved areas should be avoided).

On facilities with posted speeds over 40 miles per hour, the use of any type of curb is discouraged. Where curbs are to be used, they should be located at or outside of the shoulder edge, as discussed in Index 303.5.

In rural areas, painted channelization supplemented with raised pavement markers may be more appropriate than a raised curbed channelization. This design is as forgiving as possible and decreases the consequence of a driver's or bicyclist's failure to detect or recognize the curbed island. Consideration for snow removal operations should be determined where appropriate.

In urban areas, posted speeds less than or equal to 40 miles per hour allow more frequent use of curbed islands. Local agency requirements and matching existing conditions are factors to consider.

- (3) *Pedestrian Refuge*

Pedestrian refuge islands allow pedestrians to cross fewer lanes at a time while judging conflicts separately. They also provide a refuge

so slower pedestrians can wait for a gap in traffic while reducing total crossing distance.

At unsignalized intersections in rural city/town centers (rural main streets), suburban, or urban areas, a pedestrian refuge should be provided between opposing traffic where pedestrians are allowed to cross 2 or more through traffic lanes in one direction of travel, at marked or unmarked crosswalks. Pedestrian islands at signalized crosswalks should be considered, taking into account crossing distance and pedestrian activity. Note that signalized pedestrian crossings must be timed to allow for pedestrians to cross. See the California MUTCD, Chapter 4E, for further guidance.

Traffic islands used as pedestrian refuge are to be large enough to provide a minimum of 6 feet in the direction of pedestrian travel, without exception.

All traffic islands placed in the path of a pedestrian crossing must be accessible, refer to DIB 82 and the Standard Plans for further guidance. An example of a traffic island that serves as a pedestrian refuge is shown on Figure 405.4.

## 405.5 Median Openings

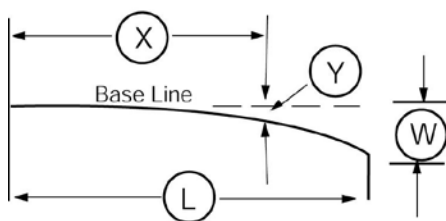
- (1) *General.* Median openings, sometimes called crossovers, provide for crossings of the median at designated locations. Except for emergency passageways in a median barrier, median openings are not allowed on urban freeways.

Median openings on expressways or divided conventional highways should not be curbed except when the median between openings is curbed, or it is necessary for delineation of traffic signal standards and other necessary hardware, or for protection of pedestrians. In these special cases B4 curbs should be used. An example of a median opening design is shown on Figure 405.5.

- (2) *Spacing and Location.* By a combination of interchange ramps and emergency passageways, provisions for access to the opposite side of a freeway may be provided for law enforcement, emergency, and maintenance vehicles to avoid extreme out-of-direction travel. Access should not be more frequent



**Table 405.4**  
**Parabolic Curb Flares Commonly Used**



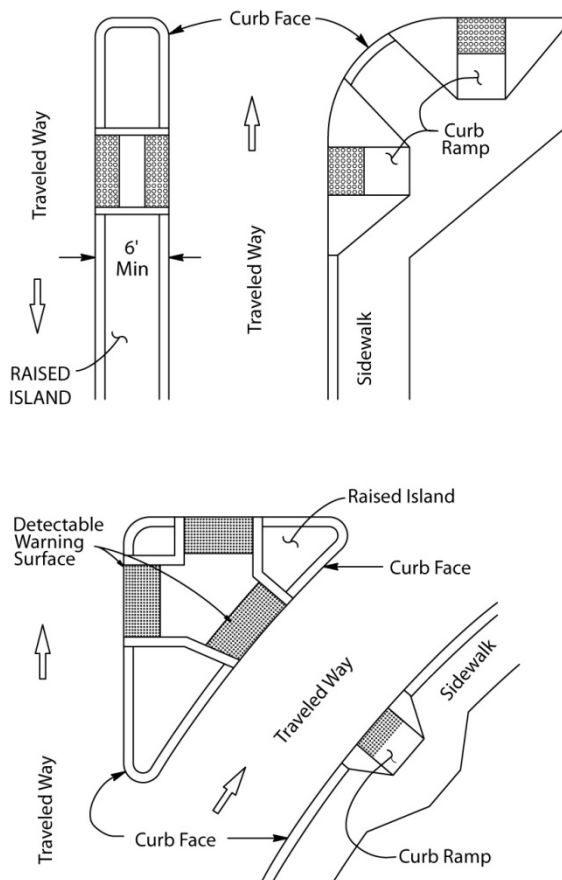
$$Y = \frac{W X^2}{L^2}$$

- (L) = Length of flare in feet  
 (W) = Maximum offset in feet  
 (X) = Distance along base line in feet  
 (Y) = Offset from base line in feet

(W) is shown in table thus  

| OFFSET IN FEET FOR GIVEN "X" DISTANCE                                                  |      |      |      |      |      |      |      |       |      |      |      |      |      |       |      |      |  |
|----------------------------------------------------------------------------------------|------|------|------|------|------|------|------|-------|------|------|------|------|------|-------|------|------|--|
| <div>Distance</div> <div><div>(L)</div><div>(X)</div></div> <div>Length of Flare</div> | 10   | 15   | 20   | 25   | 30   | 40   | 45   | 50    | 60   | 70   | 75   | 80   | 90   | 100   | 110  | 120  |  |
| 1:5 FLARES                                                                             |      |      |      |      |      |      |      |       |      |      |      |      |      |       |      |      |  |
| 25                                                                                     | 0.80 | 1.80 | 3.20 | 5.00 |      |      |      |       |      |      |      |      |      |       |      |      |  |
| 50                                                                                     | 0.40 |      | 1.60 |      | 3.60 | 6.40 |      | 10.00 |      |      |      |      |      |       |      |      |  |
| 1:10 FLARES                                                                            |      |      |      |      |      |      |      |       |      |      |      |      |      |       |      |      |  |
| 50                                                                                     | 0.20 |      | 0.80 |      | 1.80 | 3.20 |      | 5.00  |      |      |      |      |      |       |      |      |  |
| 100                                                                                    | 0.10 |      | 0.40 |      | 0.90 | 1.60 |      | 2.50  | 3.60 | 4.90 |      | 6.40 | 8.10 | 10.00 |      |      |  |
| 1:15 FLARES                                                                            |      |      |      |      |      |      |      |       |      |      |      |      |      |       |      |      |  |
| 45                                                                                     | 0.15 |      | 0.59 |      | 1.33 | 2.37 | 3.00 |       |      |      |      |      |      |       |      |      |  |
| 75                                                                                     | 0.09 |      | 0.36 |      | 0.80 | 1.42 |      | 2.22  | 3.20 | 4.36 | 5.00 |      |      |       |      |      |  |
| 90                                                                                     | 0.07 |      | 0.30 |      | 0.67 | 1.19 |      | 1.85  | 2.67 | 3.63 |      | 4.74 | 6.00 |       |      |      |  |
| 120                                                                                    | 0.06 |      | 0.22 |      | 0.50 | 0.89 |      | 1.39  | 2.00 | 2.72 |      | 3.56 | 4.50 | 5.56  | 6.72 | 8.00 |  |

**Figure 405.4**  
**Pedestrian Refuge Island**



than at three-mile intervals. See Traffic Safety Systems Guidance for additional information on the design of emergency passageways.

Emergency passageways should be located only where decision sight distance is available (see Table 201.7).

Median openings at close intervals on other types of highways create conflicts with high speed through traffic. Median openings should be spaced at intervals no closer than 1600 feet. If a median opening falls within 300 feet of an access opening, it should be placed opposite the access opening.

- (3) *Length of Median Opening.* For any three or four-leg intersection on a divided highway, the length of the median opening should be at least as great as the width of the crossroads pavement, median width, and shoulders. An

important factor in designing median openings is the path of the design vehicle making a minimum left turn at 5 miles per hour to 10 miles per hour. The length of median opening varies with width of median and angle of intersecting road.

Usually a median opening of 60 feet is adequate for 90 degree intersections with median widths of 22 feet or greater. When the median width is less than 22 feet, a median opening of 70 feet is needed. When the intersection angle is other than 90 degrees, the length of median opening should be established by using truck turn templates (see Index 404.3).

- (4) *Cross Slope.* The cross slope in the median opening should be limited to 5 percent. Crossovers on curves with super elevation exceeding 5 percent should be avoided. This cross slope may be exceeded when an existing 2-lane roadbed is converted to a 4-lane divided highway. The elevation of the new construction should be based on the 5 percent cross slope requirement when the existing roadbed is raised to its ultimate elevation.
- (5) *References.* For information related to the design of intersections and median openings, "A Policy on Geometric Design of Highways and Streets," AASHTO, should be consulted.

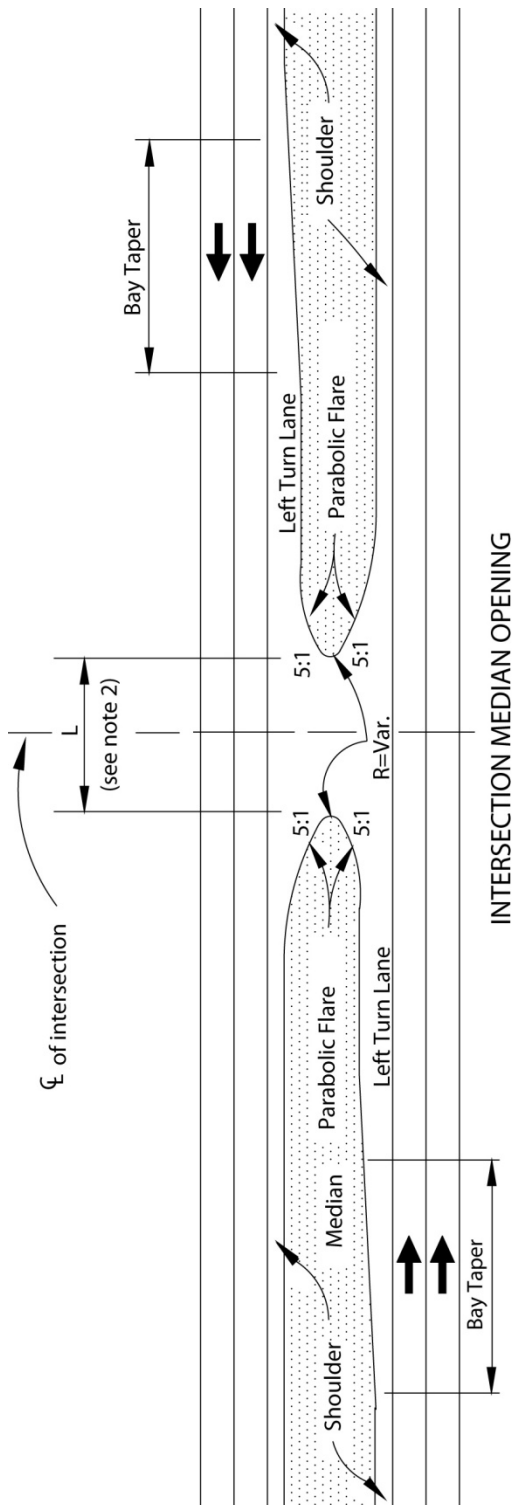
#### 405.6 Access Control

The basic guidance which govern the extent to which access rights are to be acquired at interchanges (see Topic 104, Index 205.1 and 504.8 and the PDPM) also apply to intersections at grade on expressways. Cases of access control which frequently occur at intersections are shown in Figure 405.7. This illustration does not presume to cover all situations. Where required by traffic conditions, access should be extended in order to ensure proper operation of the expressway lanes. Reasonable variations which observe the basic principles referred to above are acceptable.

However, negative impacts on the mobility needs of pedestrians, bicyclists, equestrians, and transit users need to be assessed. Pedestrians and bicyclists are sensitive to additional out of direction travel.

Figure 405.5

## Typical Design for Median Openings



## NOTES:

- ① For length of bay taper, see Table 405.2A.
- ② L = Length of median opening: varies with width of median and angle of intersecting road.  
Usually for 90° intersection, L = 60 feet for median of 22 feet and wider. L = 70 feet for medians narrower than 22 feet.
- ③ See Index 405.2.
- ④ Pedestrian and bicycle features are not shown on figure.

### 405.7 Public Road Intersections

The basic design to be used at right-angle public road intersections on the State Highway System is shown in Figure 405.7. The essential elements are sight distance (see Index 405.1) and the treatment of the right-turn on and off the main highway. Encroachment into opposing traffic lanes by the turning vehicle should be avoided or minimized.

- (1) *Right-turn Onto the Main Highway.* The combination of a circular curve joined by a 2:1 taper on the crossroads and a 75-foot taper on the main highway is designed to fit the wheel paths of the appropriate turning template chosen by the designer.

It is desirable to keep the right-turn as tight as practical, so the “STOP” or “YIELD” sign on the minor leg can be placed close to the intersection.

- (2) *Right-turn Off the Main Highway.* The combination of a circular curve joined by a 150-foot taper on the main highway and a 4:1 taper on the crossroads is designed to fit the wheel paths of the appropriate turning template and to move the rear of the vehicle off the main highway. Deceleration and storage lanes may be provided when necessary (see Index 405.3).

- (3) *Alternate Designs.* Offsets are given in Figure 405.7 for right angle intersections. For skew angles, roadway curvature, and possibly other reasons, variations to the right-angle design are permitted, but the basic rule is still to approximate the wheel paths of the design vehicle.

A three-center curve is an alternate treatment that may be used at the discretion of the designer.

Intersections are major consideration in bicycle path design as well. See Indexes 403.6 and 1003.1(5) for general bicycle path intersection design guidance. Also see Section 5.3 of the AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities.

### 405.8 City Street Returns and Corner Radii

The pavement width and corner radius at city street intersections is determined by the type of vehicle to be accommodated and the mobility needs of

pedestrians and bicyclists, taking into consideration the amount of available right of way, the types of adjoining land uses, the place types, the roadway width, and the number of lanes on the intersecting street.

At urban intersections, the California truck or the Bus Design Vehicle template may be used to determine the corner radius. Where STAA truck access is allowed, the STAA Design Vehicle template should be used giving consideration to factors mentioned above. See Index 404.3.

Smaller radii of 15 feet to 25 feet are appropriate at minor cross streets where few trucks or buses are turning. Local agency standards may be appropriate in urban and suburban areas.

Encroachment into opposing traffic lanes must be avoided.

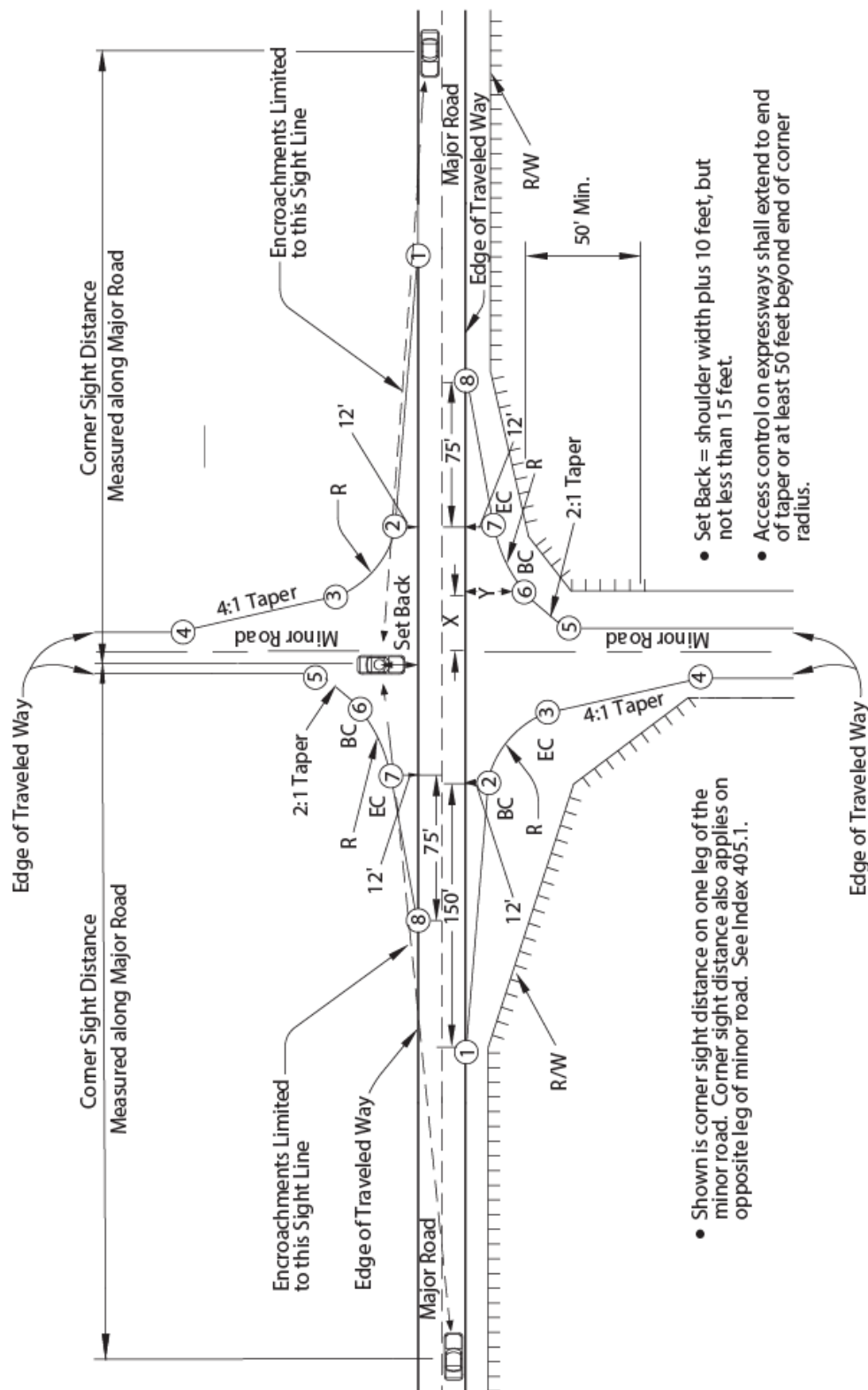
### 405.9 Widening of 2-lane Roads at Signalized Intersections

Two-lane State highways may be widened at intersections to 4-lanes whenever signals are installed. Sometimes it may be necessary to widen the intersecting road. The minimum design is shown in Figure 405.9. More elaborate treatment may be warranted by the volume and pattern of traffic movements. Unusual turning movement patterns may possibly call for a different shape of widening.

The impact on pedestrian and bicycle traffic mobility of larger intersections should be assessed before a decision is made to widen an intersection.

### 405.10 Roundabouts

Roundabout intersections on the State highway system must be developed and evaluated in accordance with National Cooperative Highway Research Program (NCHRP) Report 672 entitled “Roundabouts: An Informational Guide, 2nd ed.” (NCHRP Guide 2) dated October 2010 and Traffic Operations Policy Directive (TOPD) Number 13-02. Also see Index 401.5 for general information and guidance. See Figure 405.10 Roundabout Geometric Elements for nomenclature associated with roundabouts. Signs, striping and markings at roundabouts are to comply with the California MUTCD.

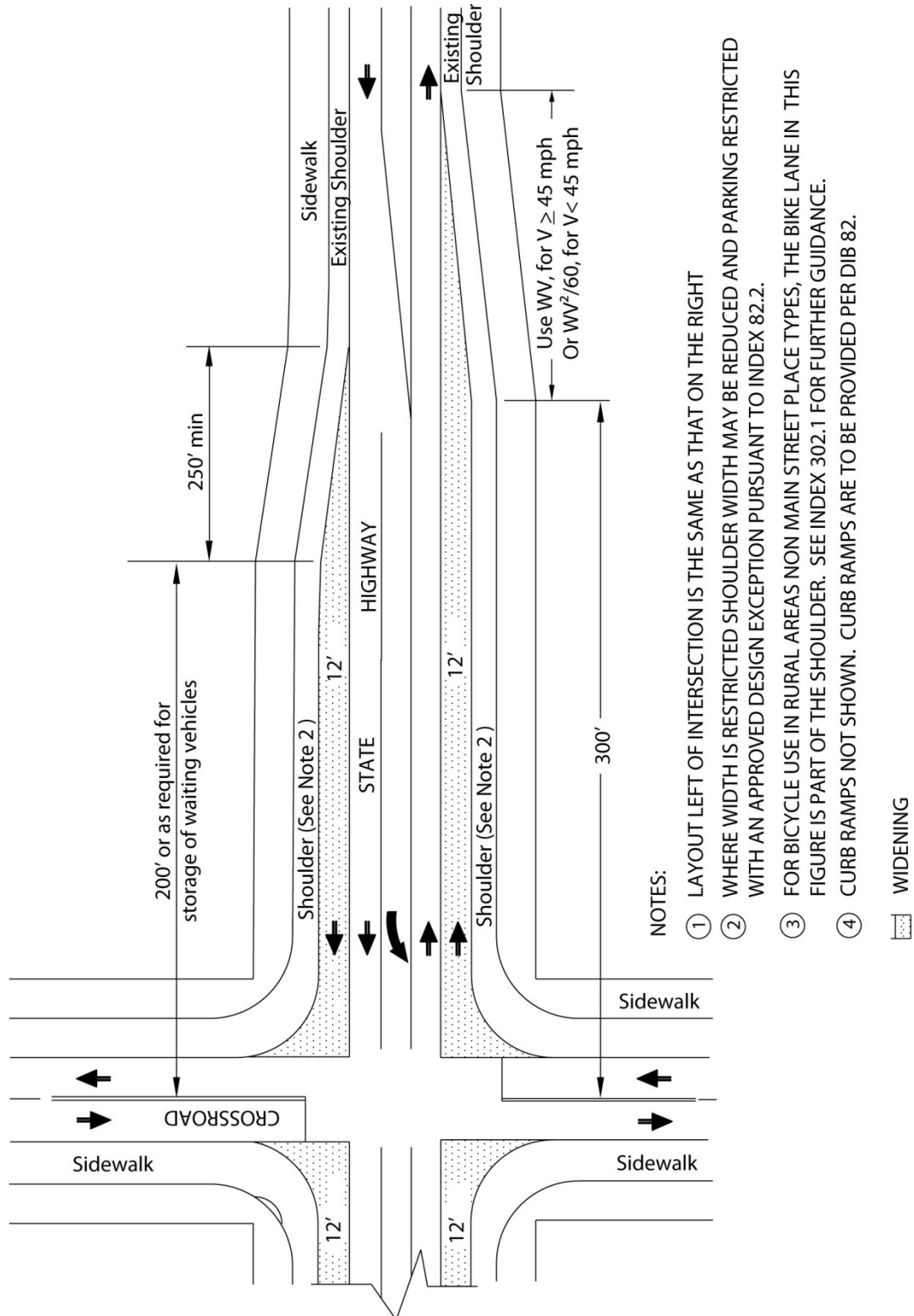


X - Distance measured from centerline of minor road along major road - feet.

Y - Offset distance measured from edge of traveled way of major road to any given point - feet.

| Radius of Curve | Design Vehicle | Pt ①   |     | Pt ②  |      | Pt ③  |       | Pt ④ |        | Pt ⑤ |       | Pt ⑥  |       | Pt ⑦  |      | Pt ⑧   |     |
|-----------------|----------------|--------|-----|-------|------|-------|-------|------|--------|------|-------|-------|-------|-------|------|--------|-----|
|                 |                | X      | Y   | X     | Y    | X     | Y     | X    | Y      | X    | Y     | X     | Y     | X     | Y    | X      | Y   |
| 30'             | Bus            | 204.20 | 0.0 | 54.20 | 12.0 | 27.49 | 34.63 | 12.0 | 96.58  | 12.0 | 40.66 | 18.23 | 28.21 | 40.32 | 12.0 | 115.32 | 0.0 |
| 40'             | California     | 215.08 | 0.0 | 65.08 | 12.0 | 29.46 | 42.17 | 12.0 | 112.03 | 12.0 | 53.35 | 21.87 | 33.61 | 51.33 | 12.0 | 126.33 | 0.0 |
| 50'             | STAA           | 226.09 | 0.0 | 76.09 | 12.0 | 31.57 | 49.71 | 12.0 | 127.98 | 12.0 | 75.63 | 30.31 | 39.01 | 67.3  | 12.0 | 142.13 | 0.0 |

**Figure 405.9**  
**Widening of Two-lane Roads at Signalized Intersections**





A roundabout is a form of circular intersection in which traffic travels counterclockwise around a central island and entering traffic must yield to the circulating traffic. Roundabouts feature, among other things, a central island, a circulatory roadway, and splitter islands on each approach. Roundabouts rely upon two basic and important operating principles:

- (a) Speed reduction at the entry and through the intersection will be achieved through geometric design and,
- (b) The yield-at-entry rule, which requires traffic entering the intersection to yield to traffic that is traveling in the circulatory roadway.

Benefits of roundabouts are:

- Fewer conflict points typically result in fewer collisions with less severity. Over half of vehicle to vehicle points of conflict associated with intersections are eliminated with the use of a roundabout. Additionally, a roundabout separates the points of conflict which eases the ability of the users to identify a conflict and helps prevent conflicts from becoming collisions.
- Roundabouts are designed to reduce the vehicular speeds at intersections. Lower speeds lessens the vehicular collision severity. Likewise, studies indicate that pedestrian and bicyclist collisions with motorized vehicles at lower speeds significantly reduce their severity.
- Roundabouts allow continuous free flow of vehicles and bicycles when no conflicts exist. This results in less noise and air pollution and reduces overall delays at roundabout intersections.

Except as indicated in this Index, the standards elsewhere in this manual do not apply to roundabouts. For the application of design standards, the approach ends of the splitter islands define the boundary of a roundabout intersection, see Figure 405.10. The design standards elsewhere in this manual apply to the approach legs beyond the approach ends of the splitter islands.

#### (1) *Design Period.*

First consider the design of a single lane roundabout per the design period guidance in

Index 103.2. If a second lane is not needed until 10 or more years, it may be better to phase the improvements. Construct the first phase of the roundabout so at the 20-year design period, an additional lane can be easily added. In order to comply with the 20-year design period, the initial project must provide the right of way needed for utility relocations, a shared-use path designed for a Class I Bikeway, and all other features other than pavement, lighting, and striping in their ultimate locations.

In some locations, it may not be practical to build a single lane roundabout that will operate for 10 years. Geometric constraints and other conflicts may preclude widening to the ultimate configuration. In such cases, other intersection configurations or control strategies addressed in Index 401.5 may need to be considered.

When staging improvements, see NCHRP Guide 2, Section 6.12.

#### (2) *Design Vehicles - See Topic 404.*

The turning path for the design vehicle, see Index 404.5, dictates many of the roundabout dimensions. The design vehicle tracking and swept width are to be used when designing all the entries and exits, where design vehicles are unrestricted (see Index 404.2), and the circulatory roadway. The percentage of trucks and their lane utilization is an important consideration on multilane roundabouts when determining if the design will allow trucks to stay within their own lane or encroach into the adjacent lane. If permit vehicles larger than the design vehicle occasionally use the proposed roundabout, they can be accommodated by having removable signs or other removable features in the central island or around the circular path to ensure their swept path can negotiate the roundabout. Roundabouts should not be overdesigned for the occasional permit vehicle.

To accurately simulate the design vehicle swept width traveling through a roundabout, the minimum speed of the design vehicle used in computer simulation software (e.g., Auto

TURN) should be 10 miles per hour through the roundabout.

(3) *Inscribed Circle Diameter.*

At single lane roundabouts, the size of the inscribed circle is largely dependent upon the turning requirements of the design vehicle. The inscribed circle diameter (ICD) must be large enough to accommodate: (a) the STAA design vehicle for all roundabouts on the National Network and on Terminal Access routes; and, (b) the California Legal design vehicle on all non-STAA route intersections on California Legal routes and California Legal KPRA Advisory routes, while maintaining adequate deflection curvature to ensure appropriate travel speeds for smaller vehicles. The design vehicle is to navigate the roundabout with the front tractor wheels off the truck apron, if one is present. Transit vehicles, fire engines and single-unit delivery vehicles are also to be able to navigate the roundabout without using the truck apron, if one is present. The inscribed circle diameter for a single lane roundabout generally ranges between 105 feet to 150 feet to accommodate the California Legal design vehicle and 130 feet to 180 feet to accommodate the STAA design vehicle.

At multilane roundabouts, the inscribed circle diameter is to achieve adequate alignment of the natural vehicle path while maintaining deflection curvature to ensure appropriate travel speeds. To achieve both of these design objectives requires a slightly larger diameter than used for a single lane roundabout. The inscribed circle diameter for a multilane (2-lane) roundabout generally ranges between 150 feet to 220 feet to accommodate the California Legal design vehicle for non-STAA route intersections on California Legal routes and California Legal KPRA Advisory routes, and 165 feet to 220 feet to accommodate the STAA design vehicle for roundabouts on the National Network and on Terminal Access routes. Similar to a single lane roundabout, the design vehicle is to be able to navigate a multilane roundabout with the front tractor wheels staying off the truck apron, if one is present. Transit vehicles, fire engines and single-unit delivery vehicles are also to be able

to navigate the roundabout without using the truck apron, if one is present.

The inscribed diameter ranges given above are typical values, design may be larger or smaller. Site location constraints and performance checks will determine if the diameter is appropriate for the location.

(4) *Entry Speeds.*

Lowering the speed of vehicles entering and traveling through the roundabout is a primary design objective that is achieved by approach alignment and entry geometry.

The following entry speeds should not be exceeded:

- Single lane entry, 25 miles per hour.
- Multilane entry, 30 miles per hour.

A bypass lane is not included in the number of entry lanes. A bypass prohibits entry into the circulatory roadway.

Entry speeds are to be determined through fastest path analysis. Fastest path is the smoothest, flattest path possible for a single vehicle in the absence of other traffic and ignoring all lane markings. The fastest path analysis should begin at least 165 feet from the inscribed circle diameter and should not bring the path closer than 3 feet from a stripe nor 5 feet from the face of a curb. These distances are minimums and the fastest path may occur further away from the curbs and striping depending on the roundabout configuration. For fastest path evaluation, see NCHRP Guide 2, Section 6.7.1.

(5) *Exit Design.*

Similar to entry design, exit design flexibility is required to achieve the optimal balance between competing design variables and project objectives to provide adequate capacity and, essentially, safety while minimizing excessive property impacts and costs. Thus, the selection of a curved versus tangential design is to be based upon the balance of each of these criteria. Exit design is influenced by the place type, pedestrian demand, bicyclist needs, the design vehicle

and physical constraints. The exit curb radii are usually larger than the entry curb radii in order to minimize the likelihood of congestion and crashes at the exits. However, the desire to minimize congestion at the exits needs to be balanced with the need to maintain an appropriate operating speed through the pedestrian crossing. Therefore, the exit path radius should not be significantly greater than the circulating path radius to ensure low speeds are maintained at the pedestrian crossing.

(6) *Number of Legs Serving the Roundabout.*

Intersections with more than four legs are often difficult to manage operationally. Roundabouts are a proven traffic control device in such situations. However, it is necessary to ensure that the design vehicle can maneuver through all unrestricted legs of the roundabout.

(7) *Pedestrian Use.*

Sidewalks around the circular roadway are to be designed as shared-use paths, see Index 405.10(8)(c). However, the guidance in Design Information Bulletin (DIB) 82 Pedestrian Accessibility Guidelines for Highway Projects must also be followed when designing these shared-use facilities around a roundabout. If there is a difference in the standards, the guidance in DIB 82 is to be followed. In addition,

- (a) Pedestrian curb ramps need to be differentiated from bike ramps:
  - The detectable warning surface (truncated domes) differentiates a pedestrian curb ramp from a bicycle ramp.
  - Detectable warning surface is required on curb ramps. They are not to be used on a bike ramp.
- (b) Truck aprons and mountable curbs are not to be placed in the pedestrian crossing areas.
- (c) See the California MUTCD for the signs and markings used at roundabouts.
- (d) At pedestrian crossing locations the accessibility design will be treated as a

midblock pedestrian street crossing. See DIB 82 for more information.

(8) *Bicyclist Use.*

- (a) General. Bicyclists may choose to travel in the circular roadway of a roundabout by taking a lane, while others may decide to travel using the shared-use path to bypass the circular roadway. Therefore, the approach and circular roadways, as well as the shared-use path all need to be designed for the mobility needs of bicyclists. See the California MUTCD for the signs and markings used at roundabouts.
- (b) Bicyclist Use of the Circular Roadway. Single lane roundabouts do not require bicyclists to change lanes in the circular roadway to select the appropriate lane for their direction of travel, so they tend to be comfortable for bicyclists to use. Even two-lane roundabouts, which may have straighter paths of travel that can lead to faster vehicular traveling speeds, appear to be comfortable for bicyclists that prefer to travel like vehicles. Roundabouts that have more than two circular lanes can create complexities in signing and striping (see the California MUTCD for guidance), and their operating speed may cause some bicyclists to decide to bypass the circular roadway and use the bicycle ramp that provides access to the shared-use path around the roundabout.
- (c) Bicyclists Use of the Shared-Use Path. The shared-use path is to be designed using the guidance in Index 1003.1 for Class I Bikeways and in NCHRP Guide 2 Section 6.8.2.2. However, the accessibility guidance in DIB 82 must also be followed when designing these shared-use facilities around a roundabout. If there is a difference in the standards, the accessibility guidance in DIB 82 is to be followed to ensure the facility is accessible to pedestrians with disabilities.

Bicycle ramps are to be located to avoid confusion as curb ramps for pedestrians. Also see Index 405.10(7) for guidance on how to differentiate the two types of ramps.

The design details and width of the ramp are also important to the bicyclist. Bicyclists approaching the bicycle ramp need to be provided the choice of merging left into the lane or moving right to use the bicycle ramp. Bicycle ramps should be placed at a 35 to 45 degree angle to the departure roadway and the sidewalk to enable the bicyclists to use the ramp and discourage bicyclists from entering the shared-use path at a speed that is detrimental to the pedestrians. The shared-use path should be designated as Class I Bikeways; however, appropriate regulatory signs may need to be posted if the local jurisdiction has a law(s) that prohibit bicyclists from riding on a sidewalk.

A landscape buffer or strip between the shared-use/Class I Bikeway and the circular roadway of the roundabout is needed and should be a minimum of 2 feet wide.

Pedestrian crossings may also be used by bicyclists; thus, these shared-use crossings need to be designed for both bicyclist and pedestrian needs.

(9) *Transit Use.*

Transit vehicles and buses will not have difficulty negotiating a roundabout when it has been designed using the California Legal design vehicle or the STAA design vehicle. However, to minimize passenger discomfort, a roundabout should be designed such that the transit vehicle or bus does not use the truck apron, if one is present.

(10) *Stopping Sight Distance and Visibility.*

See Index 201.1 for stopping sight distance guidance at roundabouts.

A domed or mounded central island, between 3.5 to 6 feet high, is needed to focus attention on the approach and through roundabout alignment. A domed central island provides a visual screen from downstream alignment and other distractions and provides a visual cue for vehicles approaching the roundabout.

In high speed environments, additional lighting of, and vertical elements in the central island (i.e., landscaping and esthetic features) may be needed.

(11) *Speed Consistency.*

Consistency in operating speeds between the various movements within the roundabout can minimize collisions between traffic streams. The operating speeds between competing traffic streams and between consecutive geometric elements should be minimized such that the maximum speed differential between them is no more than 15 miles per hour; it is preferred that the operating speed differential be less than 10 miles per hour.

(12) *Path Alignment (Natural Path).*

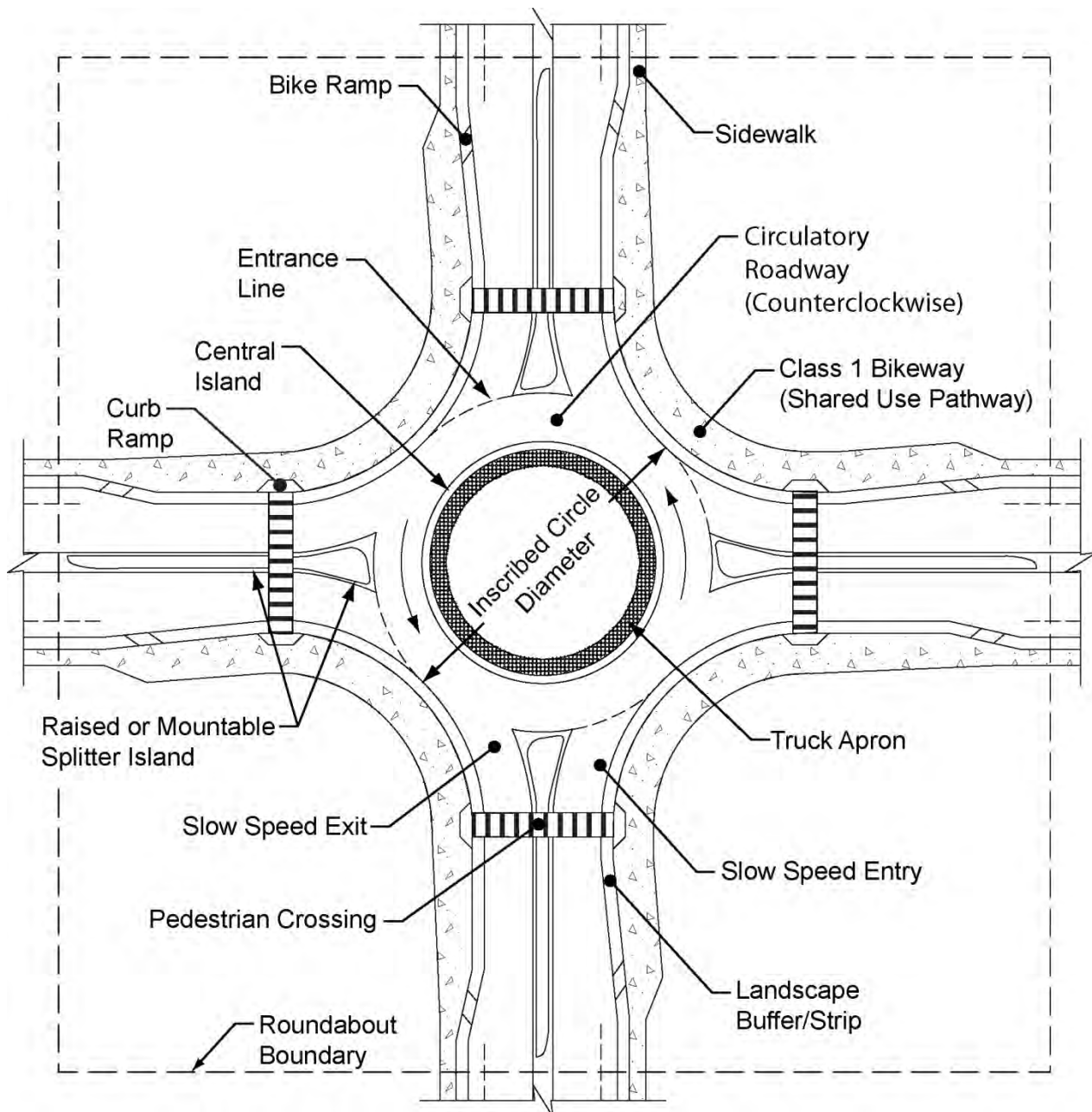
As two traffic streams approach the roundabout in adjacent lanes, drivers and bicyclists will be guided by lane markings up to the entrance line. At the yield point, they will continue along their natural trajectory into the circulatory roadway. The speed and orientation of the design vehicle at the entrance line determines what can be described as its natural path. The geometry of the exits also affects the natural path that the design vehicle travels. The natural path of two vehicles are not to overlap, see NCHRP Guide 2, Section 6.7.2.

(13) *Splitter Islands.*

Splitter islands (also called separator islands, divisional islands, or median islands) will be provided on all roundabouts. The purpose is to provide refuge for pedestrians, assist in controlling speeds, guide traffic into the roundabout, physically separate entering and exiting traffic streams, and deter wrongway movements.

The total length of the raised island should be at least 50 feet although 100 feet is desirable. On higher speed roadways, splitter island lengths of 150 feet or more is beneficial. Additionally, the splitter island should extend beyond the end of the exit curve to prevent

**Figure 405.10**  
**Roundabout Geometric Elements**



**NOTE:**

This figure is provided to only show nomenclature and is not to be used for design details.

exiting traffic from crossing into the path of approaching traffic. The splitter island width should be a minimum of 6 feet at the pedestrian crossing to adequately provide refuge for pedestrians.

Posted speeds on the approach roadway greater than or equal to 45 miles per hour require the splitter island length, as measured from the inscribed circle diameter, to be 200 feet. In some instances, a longer splitter island may be desirable. Concrete curb is to be provided on the right side of the approach roadway equal to the length of the splitter island from the inscribed circle diameter.

*(14) Access Control.*

The access control standards in Index 504.3(3) and 504.8 apply to roundabouts at interchange ramp intersections. The dimensions shown in Index 504.8 are to be measured from the inscribed circle diameter.

Driveways should not be placed within 100 feet from the inscribed circle diameter.

*(15) Lighting.*

Lighting is required at all roundabouts. See NCHRP Report 672 Chapter 8, the Traffic Manual Chapter 9 as well as consult with the District Traffic Safety Engineer.

*(16) Landscaping.*

Landscaping should be designed such that drivers and bicyclists can observe the signing and shape of the roundabout as they approach, allowing adequate visibility for making decisions within the roundabout. The landscaping of the central island can enhance the intersection by making it a focal point, by promoting lower speeds and by breaking the headlight glare of oncoming vehicles or bicycles. It is desirable to create a domed or mounded central island, between 3.5 to 6 feet high, to increase the visibility of the intersection on the approach. Contact the District Landscape Architecture Unit to provide technical assistance in designing the roundabout landscaping.

*(17) Vertical Clearance.*

The vertical clearance guidance provided in Index 309.2 applies to roundabouts.

*(18) Drainage Design.*

See Chapter 800 to 890 for further guidance.

*(19) Maintenance.*

Contact the District Maintenance Engineer and appropriate Regional Manager for maintenance strategies and practices including seasonal operations, maintenance resources, and specialized equipment. Maintenance responsibilities may also include multiple state, county, and city agencies where coordination of maintenance efforts and funding is needed.

Consider maintenance of the central island. Provide a maintenance vehicle pullout within the central island beyond the truck apron, so maintenance vehicles will not conflict with circulating trucks.

*(20) Snow Areas.*

In climate regions where snowfall requires the use of snow removal equipment, consider the equipment to be used. Design ICD's as well as entrance and exit geometry to accommodate snow removal equipment and plow limitations. Check with District Maintenance for their requirements and limitations. Geometric elements to consider that facilitate snow removal are; mountable curb, tapering the ends of curbs down to allow plows to ride over curbs, plowing accommodation in both directions, providing snow storage space within the central island, and providing minimum entry/exit widths to accommodate the plow blade. Mountable curb may be used if sidewalk/shared use path is not contiguous to the curb. Provide a planter or textured pavement between the path and the roadway. Snow storage areas must be designed to prevent snow melt from entering the circulating lanes where it can freeze. Snow storage areas must not block pedestrian paths.



(21) *Utilities.*

Utility access openings (manholes) should not be located within the traveled way within the boundary of the roundabout. Roundabouts do not have shoulders to accommodate traffic while manholes are accessed. Manholes should not be allowed within the circulating roadway to avoid closing down the intersection during access. If a manhole is absolutely necessary within the boundary of the inscribed diameter, place it in the central island and off of the truck apron. Provide a maintenance vehicle pullout to allow access to the manhole without blocking truck traffic.

**Topic 406 - Ramp Intersection Capacity Analysis**

The following procedure for ramp intersection analysis may be used to estimate the capacity of any signalized intersection where the phasing is relatively simple. It is useful in analyzing the need for additional turning and through traffic lanes. For a more complete analysis refer to the Highway Capacity Manual.

- (a) Ramp Intersection Analysis--For the typical local street interchange there is usually a critical intersection of a ramp and the crossroads that establishes the capacity of the interchange. The capacity of a point where lanes of traffic intersect is 1500 vehicles per hour. This is expressed as intersecting lane vehicles per hour (ILV/hr). Table 406 gives values of ILV/hr for various traffic flow conditions.

If a single-lane approach at a normal intersection has a demand volume of 1000 vph, for example, then the intersecting single-lane approach volume cannot exceed 500 vph without delay.

The three examples that follow illustrate the simplicity of analyzing ramp intersections using this 1500 ILV/hr concept.

- (b) Diamond Interchange--The critical intersection of a diamond type interchange must accommodate demands of three conflicting travel paths. As traffic volumes approach capacity, signalization will be needed. For the spread diamond (Figure 406A), basic capacity analysis is made on the assumption that

3-phase signalization is employed. For the tight diamond (Figure 406B), it is assumed that 4-phase signal timing is used.

- (c) 2 Quadrant Cloverleaf--Because this interchange design (Figure 406C) permits 2-phase signalization, it will have higher capacities on the approach roadways. The critical intersection is shared two ways instead of three ways as in the diamond case.

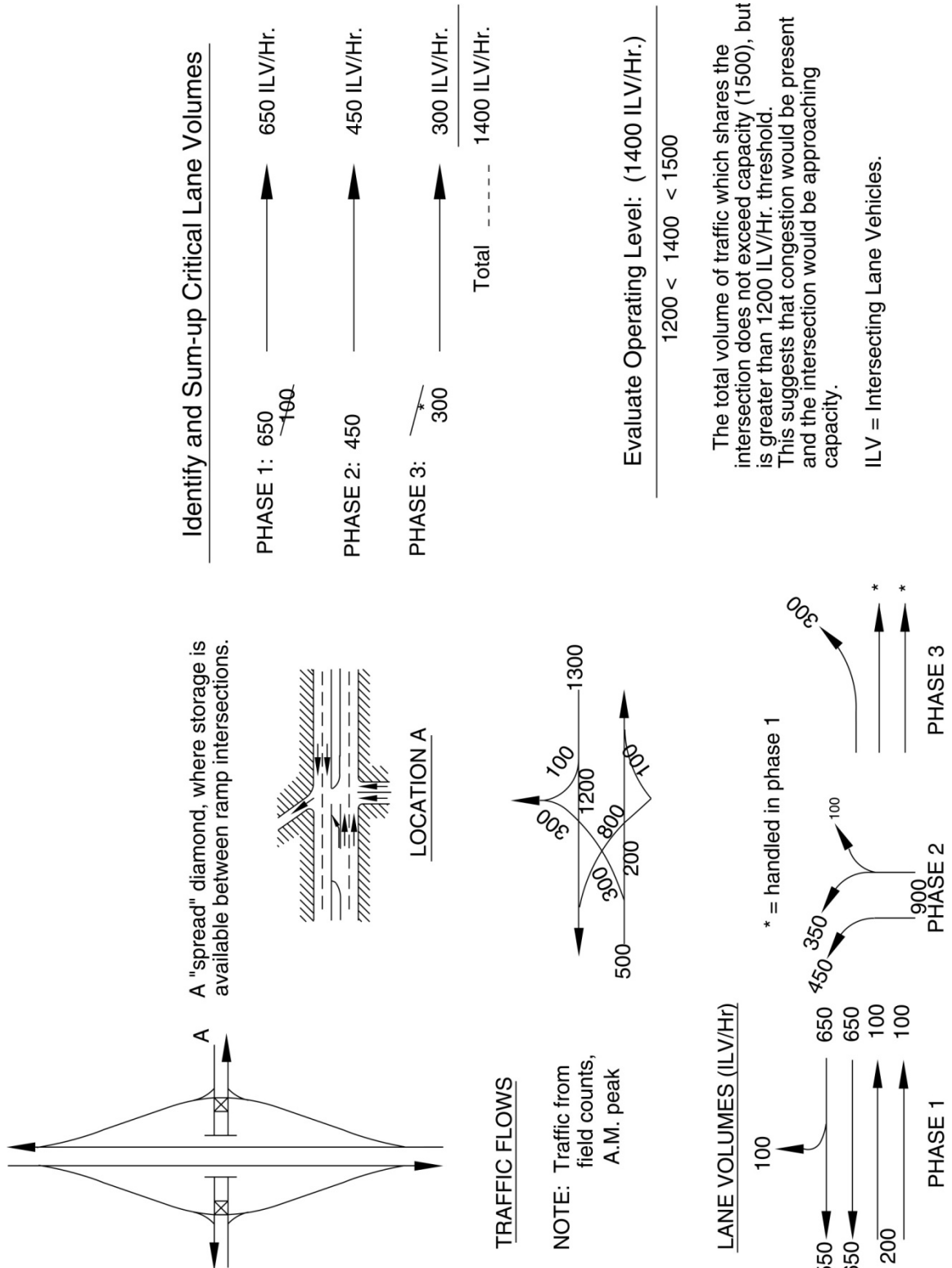
**Table 406**  
**Vehicle Traffic Flow Conditions at Intersections at Various Levels of Operation**

| ILV/hr           | Description                                                                                                                                                                                                                                                                                                                           |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <hr/>            |                                                                                                                                                                                                                                                                                                                                       |
| < 1200:          |                                                                                                                                                                                                                                                                                                                                       |
|                  | Stable flow with slight, but acceptable delay. Occasional signal loading may develop. Free midblock operations.                                                                                                                                                                                                                       |
| <hr/>            |                                                                                                                                                                                                                                                                                                                                       |
| 1200-1500:       |                                                                                                                                                                                                                                                                                                                                       |
|                  | Unstable flow with considerable delays possible. Some vehicles occasionally wait two or more cycles to pass through the intersection. Continuous backup occurs on some approaches.                                                                                                                                                    |
| <hr/>            |                                                                                                                                                                                                                                                                                                                                       |
| 1500 (Capacity): |                                                                                                                                                                                                                                                                                                                                       |
|                  | Stop-and-go operation with severe delay and heavy congestion <sup>(1)</sup> . Traffic volume is limited by maximum discharge rates of each phase. Continuous backup in varying degrees occurs on all approaches. Where downstream capacity is restrictive, mainline congestion can impede orderly discharge through the intersection. |

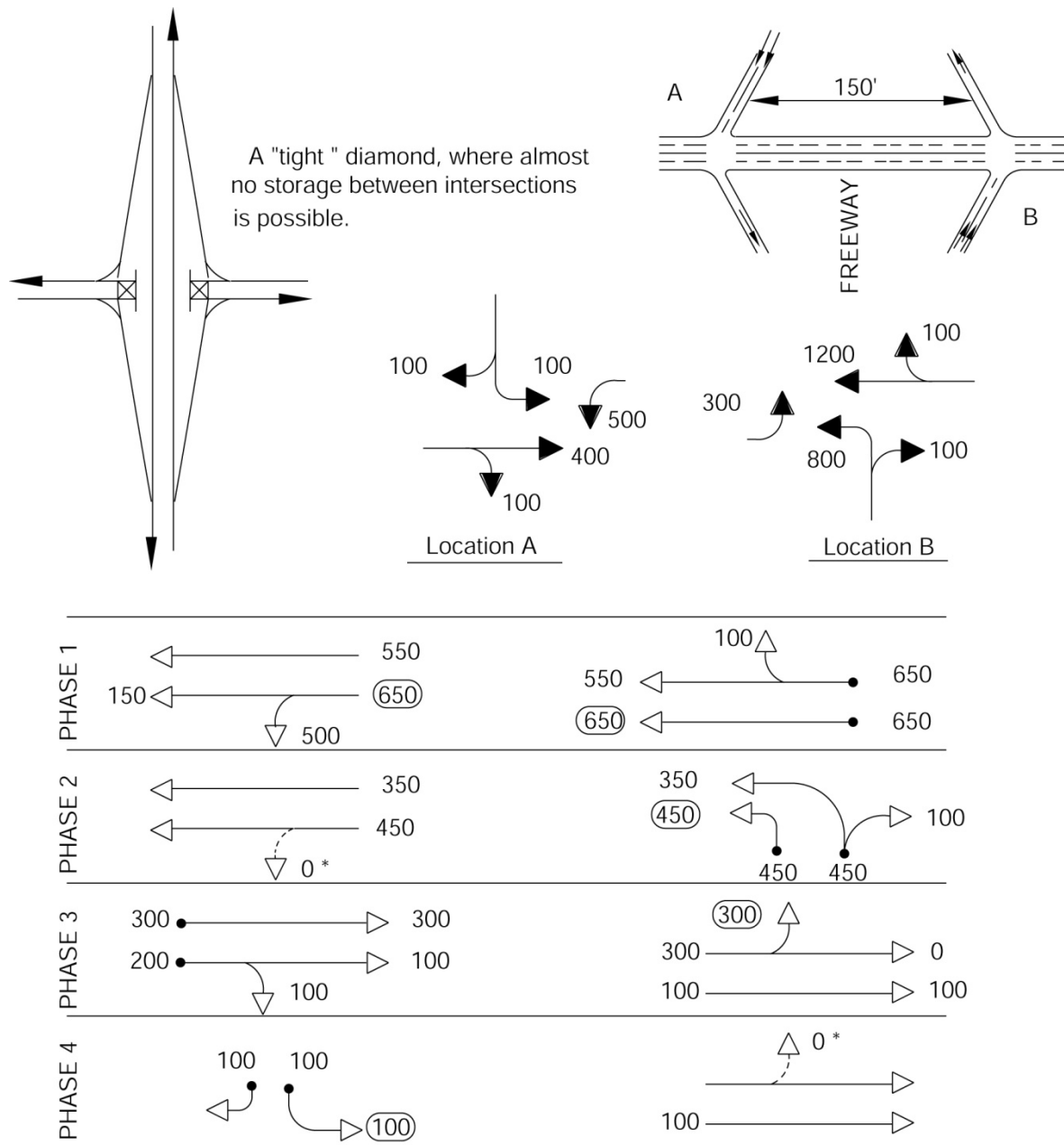
NOTE:

- (1) The amount of congestion depends on how much the ILV/hr value exceeds 1500. Observed flow rates will normally not exceed 1500 ILV/hr, and the excess will be delayed in a queue.

**Figure 406A**  
**Spread Diamond**



**Figure 406B**  
**Tight Diamond**



\*NOTE: When no storage at all is permitted, left-turn movement is cleared during this phase.

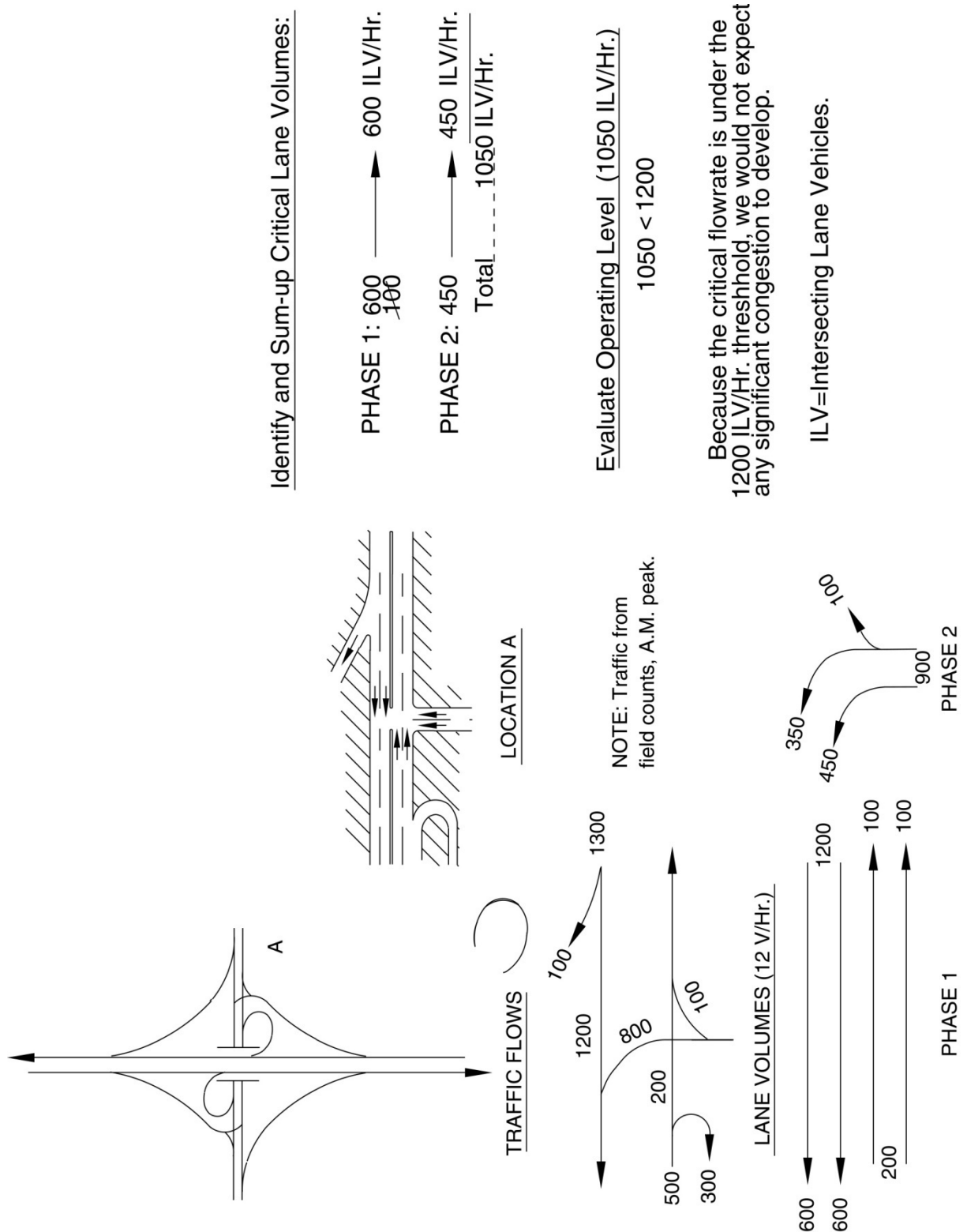
Critical Lane Volumes:

650  
450  
300  
100

ILV=Intersecting Lane Vehicles.

1500 ILV/Hr.

**Figure 406C**  
**Two-quadrant Cloverleaf**

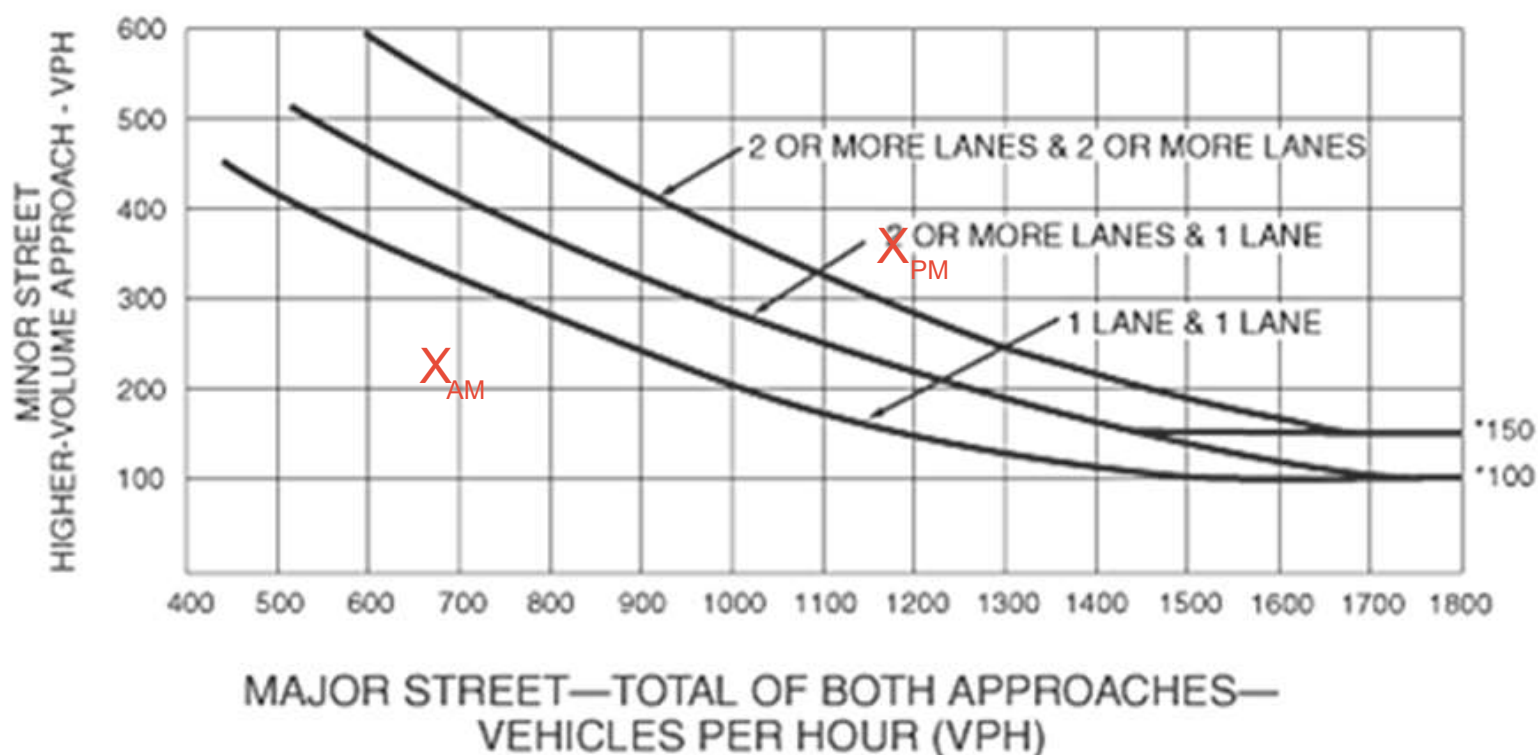


# **APPENDIX E**

## **Peak Hour Traffic Signal Warrant Worksheets**

# Campus Drive / 7th Street

Figure 4C-3. Warrant 3, Peak Hour



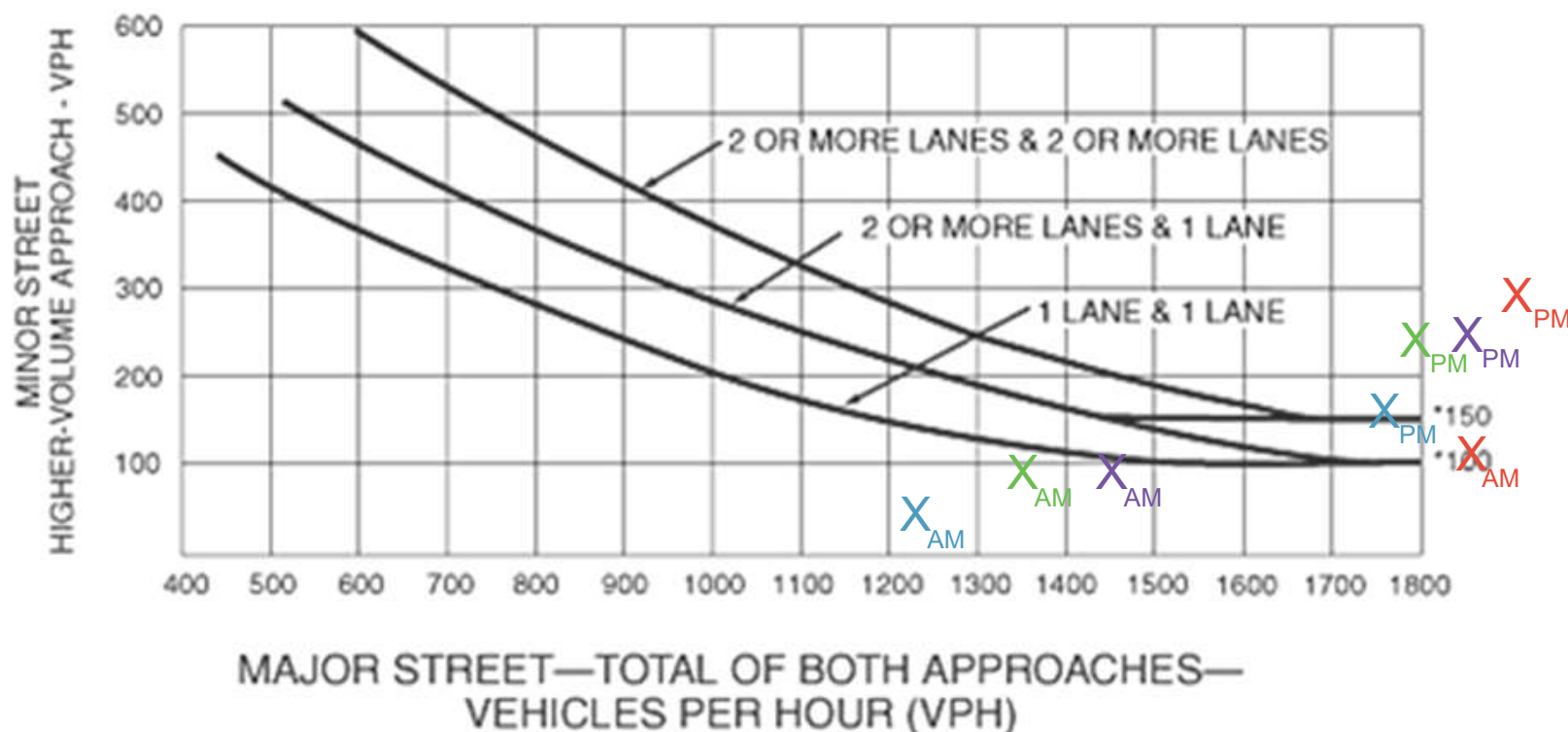
\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

| LEGEND                          |                                   |
|---------------------------------|-----------------------------------|
| X <sub>AM</sub> X <sub>PM</sub> | Cumulative Year 2042 Plus Project |



# 12th Avenue / Glendale Avenue

Figure 4C-3. Warrant 3, Peak Hour

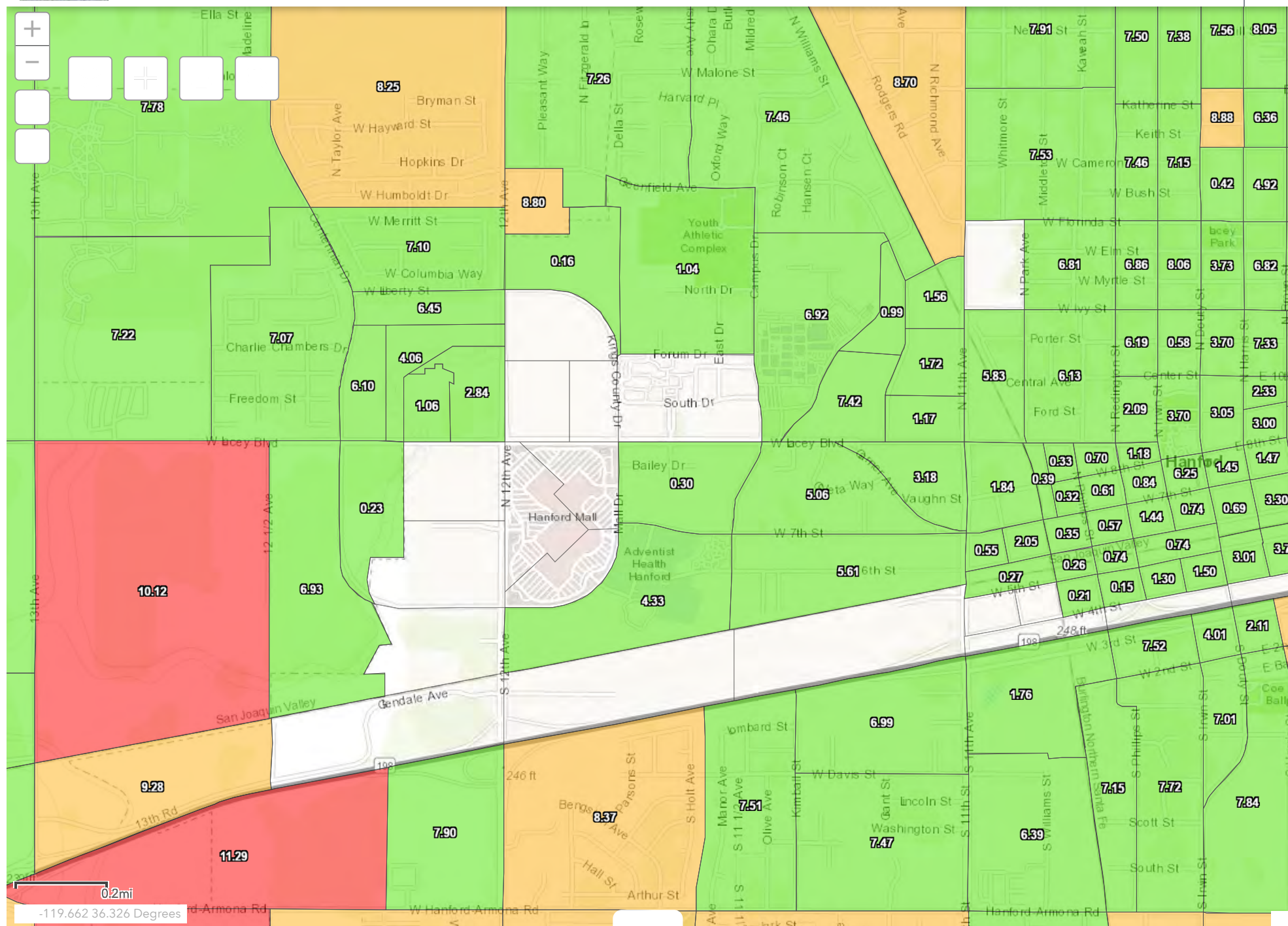


\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

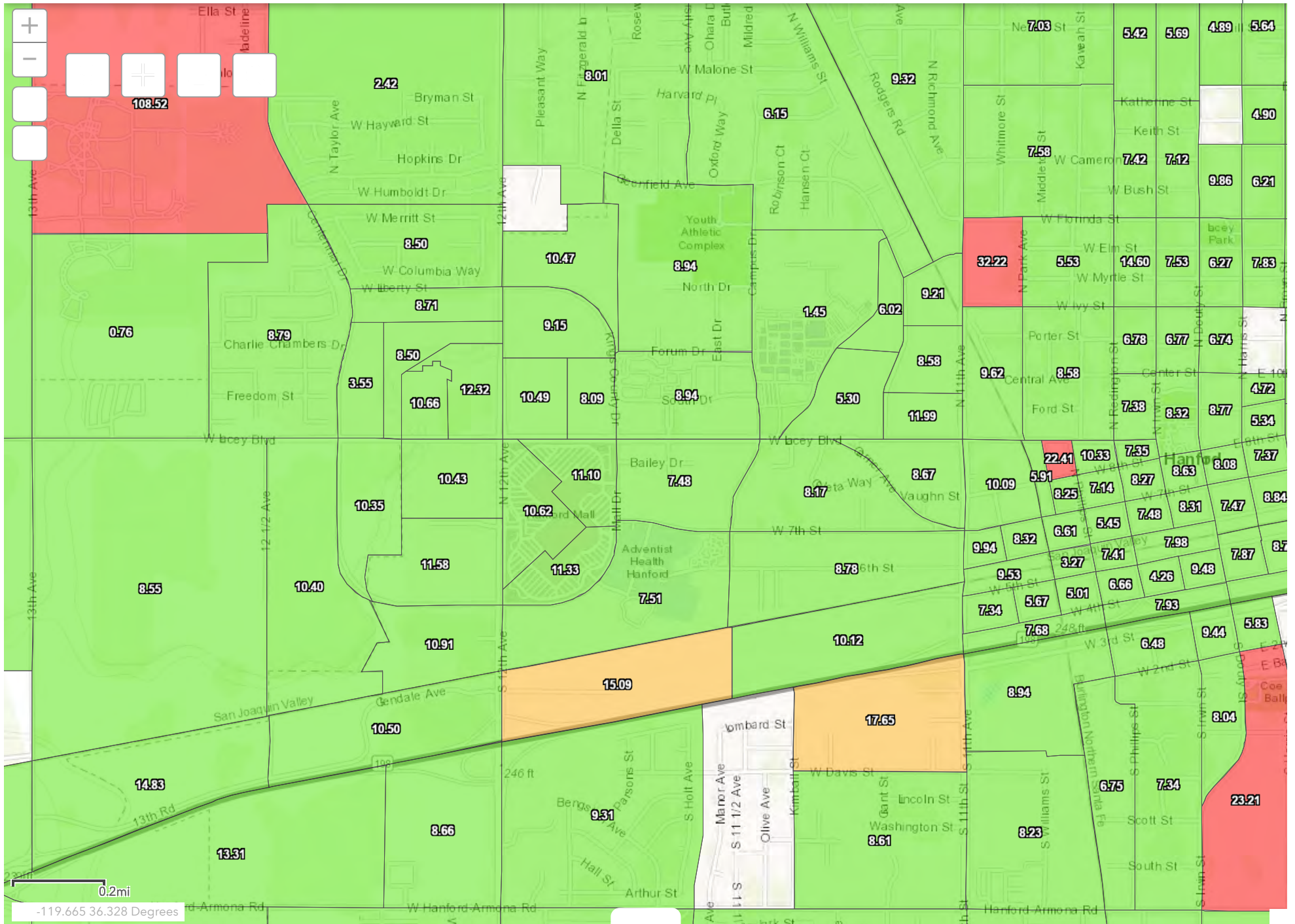
| LEGEND                          |                                   |
|---------------------------------|-----------------------------------|
| X <sub>AM</sub> X <sub>PM</sub> | Existing                          |
| X <sub>AM</sub> X <sub>PM</sub> | Existing Plus Project             |
| X <sub>AM</sub> X <sub>PM</sub> | Near-Term Plus Project            |
| X <sub>AM</sub> X <sub>PM</sub> | Cumulative Year 2042 Plus Project |

# **APPENDIX F**

## **VMT Analysis Maps**







## APPENDIX G

### HANFORD PLACE MEDICAL MIXED-USE DEVELOPMENT PROJECT VEHICLE MILES TRAVELED (VMT) ANALYSIS MEMORANDUM

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## MEMORANDUM

**DATE:** March 08, 2023

**To:** Steve Brandt, AICP

**FROM:** Ambarish Mukherjee, P.E., AICP

**SUBJECT:** Hanford Place Medical Mixed-use Development Project Vehicle Miles Traveled (VMT) Analysis Memorandum

LSA has prepared this Vehicle Miles Traveled (VMT) analysis for the Hanford Place medical development project (project) in the City of Hanford (City). The 39.23-acre vacant project site is located between State Route 198 (SR-198) and the San Joaquin Valley Railroad in the City, in Kings County (County). 5th Street passes through the project site in an east/west direction and Campus Drive passes through the project in a north/south direction. In addition, the Peoples Ditch runs through the project site.

The project proposes to develop a medical and mixed-use development and would construct 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses. The project requires a General Plan Amendment (GPA) to convert the project site from Highway Commercial to Service Commercial and High-Density Residential. Detailed proposed project land uses are shown in Table A below.

**Table A: Detailed Project Land uses**

| Building                    | Total Square Feet | Number of Units |
|-----------------------------|-------------------|-----------------|
| Ambulatory Surgery Center   | 22,525            | -               |
| Specialty Clinic            | 12,445            | -               |
| Medical Office Building     | 24,890            | 2 buildings     |
| Psychiatric Health Facility | 12,445            | -               |
| Hotel and Conference Center | 100,000           | 105 rooms       |
| Nursing College             | 35,000            | 8-10 classrooms |
| Skilled Nursing Facility    | 54,611            | 59 units        |
| Memory Care                 | 34,480            | 40 units        |
| Assisted Living Facility    | 34,380            | -               |
| Multi-Family Apartment      | 76,500            | 90 units        |
| Medical/Commercial          | 41,500            | -               |

## BACKGROUND AND ANALYSIS METRICS

On December 28, 2018, the California Office of Administrative Law cleared the revised California Environmental Quality Act (CEQA) guidelines for use. Among the changes to the guidelines was removal of vehicle delay and level of service from consideration under CEQA. With the adopted guidelines, transportation impacts are to be evaluated based on a project generated VMT.

The City has recently adopted its Senate Bill 743 (SB 743) guidelines – City of Hanford VMT Thresholds and Implementation Guidelines (guidelines), November 2022. Therefore, the project VMT analysis was conducted using the methodology and significant threshold criteria identified in the guidelines. As previously mentioned, the project includes residential, multiple medical uses, and commercial land uses. As per the guidelines, mixed-use projects should be evaluated separately for each component of the project using the applicable VMT metric.

### VMT Metrics and Thresholds

The guidelines recommend use of VMT per capita metric to evaluate residential land uses, VMT per service population for uses such as medical offices and hospitals and “net change in VMT” to evaluate commercial land uses. The guidelines also indicate that VMT per service population can be used for land uses that include trips and VMT from both visitors and employees. Though most of the project land uses are medical related that include considerable visitor trips, project uses such as Memory Care, Assisted Living, and Skilled Nursing facility only include trips from its employees and the trips/VMT from visitors on a daily basis is nominal. Therefore, to evaluate these project land uses, VMT per employee was considered as the applicable metric. The following table, Table B shows the project land uses and applicable VMT metrics used to evaluate the project land uses.

**Table B: Project land uses and applicable VMT metrics**

| Land use                    | VMT metric                 |
|-----------------------------|----------------------------|
| Ambulatory Surgery Center   | VMT per service population |
| Specialty Clinic            | VMT per service population |
| Medical Office Building     | VMT per service population |
| Psychiatric Health Facility | VMT per service population |
| Hotel and Conference Center | VMT per service population |
| Nursing College             | VMT per service population |
| Skilled Nursing Facility    | VMT per employee           |
| Memory Care                 | VMT per employee           |
| Assisted Living Facility    | VMT per employee           |
| Multi-Family Apartment      | VMT per capita             |
| Medical/Commercial          | Net change in roadway VMT  |

The guidelines also established Kings County as the region and 13% as the threshold for comparison of VMT metrics. Therefore, if the project VMT per capita, VMT per employee, or VMT per service population exceeds 87% of corresponding Kings County baseline average, the project would have a significant VMT impact. Similarly, for the evaluation of retail component, if the regional roadway VMT is greater in the “with project” scenario compared to the “no project” scenario, the project will have a significant VMT impact.

The guidelines also provide multiple screening criteria to screen out land use projects from a detailed VMT analysis. As mentioned above, as per the guidelines, mixed-use projects should be evaluated separately for each component of the project using applicable VMT metrics. Similarly, each component of the project can be evaluated against the screening criteria established in the guidelines. The following table, Table C shows various screening criteria from the guidelines and their applicability to the project land uses. As shown in Table C, only the retail component of the project can be screened out of detailed VMT analysis. However, the retail component was included in the project model run to appropriately account for the internal capture that will occur due to the mixed use nature of the project.

**Table C: Project Land use Screening Evaluation**

| Project Land use            | VMT metric                 | Within Transit Priority Area | Retail less than 55 TSF | Redevelopment | Affordable Housing | Low VMT area (Screening Maps) * | Screened Out |
|-----------------------------|----------------------------|------------------------------|-------------------------|---------------|--------------------|---------------------------------|--------------|
| Ambulatory Surgery Center   | VMT per service population | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Specialty Clinic            | VMT per service population | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Medical Office Building     | VMT per service population | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Psychiatric Health Facility | VMT per service population | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Hotel and Conference Center | VMT per service population | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Nursing College             | VMT per service population | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Skilled Nursing Facility    | VMT per employee           | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Memory Care                 | VMT per employee           | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Assisted Living Facility    | VMT per employee           | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Multi-Family Apartment      | VMT per capita             | No                           | N/A                     | N/A           | N/A                | N/A                             | No           |
| Medical/Commercial          | Net Change in roadway VMT  | No                           | Yes                     | N/A           | N/A                | N/A                             | Yes          |

\*: Use of screening maps is not applicable for projects that require a GPA

The guidelines include an additional screening criterion for total trips generated by the project. While other screening criteria are applicable for individual project components, this criterion should be applied to entire project. The project requires a GPA and therefore if the project generates less

than 500 daily trips, the project can be screened out of a VMT analysis. Based on project daily trip generation, the project generates more than 500 daily trips and therefore, the daily trip criterion is not applicable to the project. Given that the project land uses other than retail cannot be screened out, a detailed VMT analysis was conducted for these land uses. The VMT analysis is described in detail in the following sections.

## METHODOLOGY

For projects that require a detailed VMT analysis, the guidelines recommend use of Kings County Association of Governments (KCAG) travel demand model to conduct the VMT analysis. Therefore, KCAG model was used for the VMT evaluation of the project.

Numerical values for the regional thresholds (VMT per capita, VMT per employee, and VMT per service population) have been obtained from the guidelines document – Table E: Significance Thresholds for VMT Analysis.

### Project Traffic Analysis Zone Update

To calculate the project's VMT metrics, the first step was to update the traffic analysis zones (TAZs) in the model that include the project area. KCAG model includes capability to add new zones or conduct zone splits. Ideally, the project needs to be isolated to isolate the project VMT. Based on the review of project land uses, it was determined that addition of six new TAZs (one for multifamily residential, one for hotel/conference center, one for memory care, assisted living, and skilled nursing facility, one for specialty clinic, medical office, ambulatory surgery center, and psychiatric facility, one for nursing college, and one for commercial/retail land uses) would be adequate to incorporate the project in the model. Similar project land uses were grouped together for modeling purposes. Therefore, six new TAZs were added in the project location within the model, and the proposed project socioeconomic data were added within these TAZs for purposes of this analysis.

The project traffic impact study – Draft Hanford Place Development Traffic Impact Study, December 2020 by VRPA Technologies Inc (TIS), included employee information for some of the project land uses. Number of employees information for available project land uses was obtained from the project TIS. For remaining project land uses, number of employees information was estimated using Institute of Transportation Engineers (ITE) Trip Generation Manual, 11<sup>th</sup> Edition. ITE trip generation manual includes trip rates for land uses by different units (thousand square feet- TSF, employees) which can be used to estimate number of employees per TSF for land uses. LSA converted the project land uses into model socioeconomic categories using the process described above. The KCAG model socioeconomic database for the baseline (2015) scenario was updated with the project socioeconomic data within the six project TAZs.

Based on project description, vehicular access to the site would be provided by Glendale Avenue, 5th Street, and Campus Drive. The extension of these roadways would be constructed to City standards and would be dedicated as public right of way. Therefore, model roadway network was updated to include these extensions (Glendale Ave, 5<sup>th</sup> Street, and Campus Drive).

Model run was conducted for this updated model and the outputs from this model run were used to estimate project VMT metrics for each of the project land uses.

### Project Service Population

Also as indicated in the guidelines, for land uses that include substantial user base like hotels, hospitals, medical offices, and other similar uses, a significant amount of trips and VMT is generated by visitors, or patients. As such, as stated in the City's VMT guidelines, customers/consumers must be included as part of the service population calculations to calculate project VMT per service population.

For the project land uses such as medical office building, ambulatory surgery center, and hotel, majority of trips and VMT would be generated by patients and visitors. Therefore, LSA used information from the KCAG TDM run to estimate the number of patients/visitors for the project for each of the applicable uses. Trip purpose information from the travel model was used to differentiate between employee trips and patient/visitor trips. Trips for all project TAZs were extracted by trip purpose in order to identify trips made by patients/visitors. Estimation of visitors using trip purpose information from the model is shown in detail in Table 2 of Appendix A.

### VMT ANALYSIS

Table D shows the result of the VMT analysis. As shown in Table D, the project VMT per capita for residential component of the project is 39.9 percent lower than the regional threshold. Similarly, the project VMT per employee for the memory care, assisted living, and skilled nursing facility uses is 62.7 percent lower than the corresponding regional threshold. Also, the VMT per service population for rest of non-residential uses (except retail/commercial) is 43.6 percent lower than the regional threshold. As such, based on the project's VMT analysis, the project will not have a significant VMT impact.

**Table D: Project VMT metrics and Regional Threshold Comparison**

| 2015                              | Project | City of Hanford Threshold * | Difference | % Difference |
|-----------------------------------|---------|-----------------------------|------------|--------------|
| <b>VMT Per Capita</b>             | 5.40    | 8.99                        | -3.59      | -39.9%       |
| <b>VMT per Employee</b>           | 6.32    | 16.95                       | -10.63     | -62.7%       |
| <b>VMT per service population</b> | 12.32   | 21.84                       | -9.52      | -43.6%       |

\* Obtained from City of Hanford VMT Thresholds and Implementation Guidelines, November 2022. (Table E: Significance Thresholds for VMT Analysis)

Detailed VMT calculation worksheet is included in Appendix A.

### ATTACHMENTS

Appendix A: VMT Calculation Worksheet

## Appendix A

Table 1 - VMT Calculations

| Multi Family                | Project | City of Hanford Threshold * |
|-----------------------------|---------|-----------------------------|
| Total Households (a)        | 90      |                             |
| Total Population (b)        | 211     |                             |
| Homebased (HB) VMT (c')     | 1,138   |                             |
| HB VMT per capita (d = c/b) | 5.40    | 8.99                        |

| Memory care, Assisted Living, and Skilled Nursing Facility | Project | City of Hanford Threshold * |
|------------------------------------------------------------|---------|-----------------------------|
| Total Employment (a)                                       | 24      |                             |
| Homebased Work (HBW) VMT (b)                               | 152     |                             |
| HBW VMT per employee (c = b/a)                             | 6.32    | 16.95                       |

| Ambulatory Surgery Center, Specialty Clinic, Medical Office Building, Psychiatric Health Facility | Project | City of Hanford Threshold * |
|---------------------------------------------------------------------------------------------------|---------|-----------------------------|
| Total Employment (a)                                                                              | 159     |                             |
| Total consumers/patients (b)                                                                      | 85      |                             |
| Total service population (c = b+a)                                                                | 244     |                             |
| Origin-Destination (OD) VMT (d)                                                                   | 3,165   |                             |
| VMT per service population (e=d/c)                                                                | 12.99   | 21.84                       |

| Hotel/Conference Center            | Project | City of Hanford Threshold * |
|------------------------------------|---------|-----------------------------|
| Total Employment (a)               | 59      |                             |
| Total visitors (b)                 | 90      |                             |
| Total service population (c = b+a) | 148     |                             |
| Origin-Destination (OD) VMT (d)    | 1,808   |                             |
| VMT per service population (e=d/c) | 12.19   | 21.84                       |

| Nursing College                    | Project | City of Hanford Threshold * |
|------------------------------------|---------|-----------------------------|
| Total Employment (a)               | 10      |                             |
| Total Students (b)                 | 96      |                             |
| Total service population (c = b+a) | 106     |                             |
| Origin-Destination (OD) VMT (d)    | 1,162   |                             |
| VMT per service population (e=d/c) | 10.96   | 21.84                       |



| Combined - Ambulatory Surgery Center<br>Specialty Clinic, Medical Office Building,<br>Psychiatric Health Facility, Hotel, and Nursing<br>College | Project | City of Hanford<br>Threshold * |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------|
| Total Employment (a)                                                                                                                             | 227     |                                |
| Total consumers/patients (b)                                                                                                                     | 271     |                                |
| Total service population (c = b+a)                                                                                                               | 498     |                                |
| Origin-Destination (OD) VMT (d)                                                                                                                  | 6,136   |                                |
| VMT per service population (e=d/c)                                                                                                               | 12.32   | 21.84                          |

*\* Tripends for appropriate trip purposes are identified as customer tripends*

*As a conservative estimate, vehicle trips are used as number of customers*

**Table 2 - Estimation of Customer Population**

**Vehicle Trips by Trip purpose - Ambulatory Surgery Center, Specialty Clinic,  
Medical Office Building, Psychiatric Health Facility**

| Trip Purpose                  | Productions | Attractions |
|-------------------------------|-------------|-------------|
| Homebased Work (HW)           | -           | 142         |
| Homebased Shop (HS)           | -           | 39          |
| Homebased School (HK)         | -           | -           |
| Homebased College (HC)        | -           | -           |
| Homebased Other (HO)          | -           | 48          |
| Workbased Other (WO)          | 13          | 13          |
| Otherbased Other (OO)         | 110         | 109         |
| Highway Commercial (HY)       | -           | -           |
| <b>Total</b>                  | <b>123</b>  | <b>350</b>  |
| <b>Total Customer trips *</b> |             | <b>85</b>   |

\* Attractions for HO, WO, OO trip purposes are considered for trips by customers (48+13+ 109 =170)

Trip ends are divided by 2 to account for trips (from/to) (170/2 = 85)

Also as a conservative estimate vehicle trips are considered as person trips/total customers

**Vehicle Trips by Trip purpose - Hotel/Conference Center**

| Trip Purpose                  | Productions | Attractions |
|-------------------------------|-------------|-------------|
| Homebased Work (HW)           | -           | 56          |
| Homebased Shop (HS)           | -           | 52          |
| Homebased School (HK)         | -           | -           |
| Homebased College (HC)        | -           | -           |
| Homebased Other (HO)          | -           | 41          |
| Workbased Other (WO)          | 11          | 11          |
| Otherbased Other (OO)         | 129         | 128         |
| Highway Commercial (HY)       | -           | -           |
| <b>Total</b>                  | <b>140</b>  | <b>288</b>  |
| <b>Total Customer trips *</b> |             | <b>90</b>   |

\* Attractions for HO, WO, OO trip purposes are considered for trips by customers (41 + 11 + 128 = 180)

Trip ends are divided by 2 to account for trips (from/to) (180/2 = 90)

Also as a conservative estimate vehicle trips are considered as person trips/total customers



November 3, 2022

Diana Black  
City of Hanford  
317 N Douty St  
Hanford, CA 93230

Re: Hanford Place  
GPA 2022-01, RZ 2022-01, PUD 2022-01

Dear Diana Black,

Thank you for providing PG&E the opportunity to review the proposed plans for Hanford Place dated 10/18/2022. Our review indicates the proposed improvements do not appear to directly interfere with existing PG&E facilities or impact our easement rights.

Please note this is our preliminary review and PG&E reserves the right for additional future review as needed. This letter shall not in any way alter, modify, or terminate any provision of any existing easement rights. If there are subsequent modifications made to the design, we ask that you resubmit the plans to the email address listed below.

If the project requires PG&E gas or electrical service in the future, please continue to work with PG&E's Service Planning department: <https://www.pge.com/cco/>.

As a reminder, before any digging or excavation occurs, please contact Underground Service Alert (USA) by dialing 811 a minimum of 2 working days prior to commencing any work. This free and independent service will ensure that all existing underground utilities are identified and marked on-site.

If you have any questions regarding our response, please contact the PG&E Plan Review Team at [pgeplanreview@pge.com](mailto:pgeplanreview@pge.com).

Sincerely,

PG&E Plan Review Team  
Land Management



November 8, 2022

Gabrielle Myers  
City of Hanford  
Department of Community Development  
319 North Douty Street  
Hanford CA, 93230

**Project: Planned Unit Development No. 2022-01**

**District CEQA Reference No: 20221396**

Dear Mr. Myers:

The San Joaquin Valley Air Pollution Control District (District) has reviewed the Planned Unit Development (PUD) referenced above from the City of Hanford (City). Per the PUD, the project consists of constructing a master planned medical and mixed-use development, including the construction of 15 buildings consisting of medical outpatient clinic services, a hotel and conference center, specialized education, retail, medical office, skilled nursing and assisted living, and multi-family residential uses, as well as a bio infiltration basin, associated open space, circulation and parking, and infrastructure improvements (Project). The Project is located between 11th and 12th Avenue along Glendale Drive, north of Highway 198 in Hanford, CA.

The District offers the following comments regarding the Project:

### **1) Project Related Emissions**

At the federal level under the National Ambient Air Quality Standards (NAAQS), the District is designated as extreme nonattainment for the 8-hour ozone standards and serious nonattainment for the particulate matter less than 2.5 microns in size (PM<sub>2.5</sub>) standards. At the state level under California Ambient Air Quality Standards (CAAQS), the District is designated as nonattainment for the 8-hour ozone, PM<sub>10</sub>, PM<sub>2.5</sub> standards.

The District's initial review of the Project concludes that emissions resulting from construction and/or operation of the Project may exceed any of the following significance thresholds as identified in the District's Guidance for Assessing and Mitigating Air Quality Impacts: <https://www.valleyair.org/transportation/GAMAQI.pdf>.

**Samir Sheikh**  
Executive Director/Air Pollution Control Officer

**Northern Region**  
4800 Enterprise Way  
Modesto, CA 95356-8718  
Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**  
1990 E. Gettysburg Avenue  
Fresno, CA 93726-0244  
Tel: (559) 230-6000 FAX: (559) 230-6061

**Southern Region**  
34946 Flyover Court  
Bakersfield, CA 93308-9725  
Tel: (661) 392-5500 FAX: (661) 392-5585

The District recommends that a more detailed preliminary review of the Project be conducted for the Project's construction and operational emissions.

### **1a) Construction Emissions**

The District recommends, to reduce impacts from construction-related diesel exhaust emissions, the Project should utilize the cleanest available off-road construction equipment, including the latest tier equipment.

### **1b) Operational Emissions**

Operational (ongoing) air emissions from mobile sources and stationary sources should be analyzed separately. For reference, the District's significance thresholds are identified in the District's Guidance for Assessing and Mitigating Air Quality Impacts:

<https://www.valleyair.org/transportation/GAMAQI.pdf>.

*Recommended Mitigation Measure:* At a minimum, project related impacts on air quality should be reduced to levels of significance through incorporation of design elements such as measures that reduce Vehicle Miles Traveled (VMTs), and measures that increase energy efficiency. More information on transportation mitigation measures can be found at:

<http://www.valleyair.org/transportation/Mitigation-Measures.pdf>.

### **1c) Recommended Model for Quantifying Air Emissions**

Project-related criteria pollutant emissions from construction and operational sources should be identified and quantified. Emissions analysis should be performed using the California Emission Estimator Model (CalEEMod), which uses the most recent CARB-approved version of relevant emissions models and emission factors. CalEEMod is available to the public and can be downloaded from the CalEEMod website at: [www.caleemod.com](http://www.caleemod.com).

## **2) Project Siting**

Based on the PUD, the Project consists of a master planned medical and mixed-use development that includes sensitive and residential uses adjacent to an existing freeway (SR 198). The California Air Resources Board (CARB) recommends that residences and other sensitive receptors not be located within 500 feet of freeways or high traffic roadways. Please refer to CARB's Air Quality and Land Use Handbook: A Community Health Perspective located at: <https://ww3.arb.ca.gov/ch/handbook.pdf>.

### **3) Health Risk Screening/Assessment**

The City should evaluate the risk associated with the Project for sensitive receptors (residences, businesses, hospitals, day-care facilities, health care facilities, etc.) in the area and mitigate any potentially significant risk to help limit exposure of sensitive receptors to emissions.

To determine potential health impacts on surrounding receptors (residences, businesses, hospitals, day-care facilities, health care facilities, etc.) a Prioritization and/or a Health Risk Assessment (HRA) should be performed for the Project. These health risk determinations should quantify and characterize potential Toxic Air Contaminants (TACs) identified by the Office of Environmental Health Hazard Assessment/California Air Resources Board (OEHHA/CARB) that pose a present or potential hazard to human health.

Health risk analyses should include all potential air emissions from the project, which include emissions from construction of the project, including multi-year construction, as well as ongoing operational activities of the project. Note, two common sources of TACs can be attributed to diesel exhaust emitted from heavy-duty off-road earth moving equipment during construction, and from ongoing operation of heavy-duty on-road trucks.

#### Prioritization (Screening Health Risk Assessment):

A "Prioritization" is the recommended method for a conservative screening-level health risk assessment. The Prioritization should be performed using the California Air Pollution Control Officers Association's (CAPCOA) methodology.

The District recommends that a more refined analysis, in the form of an HRA, be performed for any project resulting in a Prioritization score of 10 or greater. This is because the prioritization results are a conservative health risk representation, while the detailed HRA provides a more accurate health risk evaluation.

To assist land use agencies and project proponents with Prioritization analyses, the District has created a prioritization calculator based on the aforementioned CAPCOA guidelines, which can be found here:

[http://www.valleyair.org/busind/pto/emission\\_factors/Criteria/Toxics/Utilities/PRIORITIZATION-CALCULATOR.xls](http://www.valleyair.org/busind/pto/emission_factors/Criteria/Toxics/Utilities/PRIORITIZATION-CALCULATOR.xls)

#### Health Risk Assessment:

Prior to performing an HRA, it is strongly recommended that land use agencies/project proponents develop and submit for District review a health risk modeling protocol that outlines the sources and methodologies that will be used to perform the HRA. This step will ensure all components are addressed when performing the HRA.



A development project would be considered to have a potentially significant health risk if the HRA demonstrates that the project-related health impacts would exceed the District's significance threshold of 20 in a million for carcinogenic risk, or 1.0 for either the Acute or Chronic Hazard Indices.

A project with a significant health risk would trigger all feasible mitigation measures. The District strongly recommends that development projects that result in a significant health risk not be approved by the land use agency.

The District is available to review HRA protocols and analyses. For HRA submittals please provide the following information electronically to the District for review:

- HRA (AERMOD) modeling files
- HARP2 files
- Summary of emissions source locations, emissions rates, and emission factor calculations and methodologies.

For assistance, please contact the District's Technical Services Department by:

- E-Mailing inquiries to: [hramodeler@valleyair.org](mailto:hramodeler@valleyair.org)
- Calling (559) 230-5900

*Recommended Measure:* Development projects resulting in TAC emissions should be located an adequate distance from residential areas and other sensitive receptors in accordance to CARB's Air Quality and Land Use Handbook: A Community Health Perspective located at <https://www3.arb.ca.gov/ch/handbook.pdf>.

#### **4) Ambient Air Quality Analysis**

An Ambient Air Quality Analysis (AAQA) uses air dispersion modeling to determine if emissions increases from a project will cause or contribute to a violation of State or National Ambient Air Quality Standards. The District recommends an AAQA be performed for the Project if emissions exceed 100 pounds per day of any pollutant.

An acceptable analysis would include emissions from both project-specific permitted and non-permitted equipment and activities. The District recommends consultation with District staff to determine the appropriate model and input data to use in the analysis.

Specific information for assessing significance, including screening tools and modeling guidance, is available online at the District's website: [www.valleyair.org/ceqa](http://www.valleyair.org/ceqa).

## **5) Voluntary Emission Reduction Agreement**

Criteria pollutant emissions may result in emissions exceeding the District's significance thresholds, potentially resulting in a significant impact on air quality. When a project is expected to have a significant impact, the District recommends the environmental review also include a discussion on the feasibility of implementing a Voluntary Emission Reduction Agreement (VERA) for this Project.

A VERA is a mitigation measure by which the project proponent provides pound-for-pound mitigation of emissions increases through a process that develops, funds, and implements emission reduction projects, with the District serving a role of administrator of the emissions reduction projects and verifier of the successful mitigation effort. To implement a VERA, the project proponent and the District enter into a contractual agreement in which the project proponent agrees to mitigate project specific emissions by providing funds for the District's incentives programs. The funds are disbursed by the District in the form of grants for projects that achieve emission reductions. Thus, project-related impacts on air quality can be mitigated. Types of emission reduction projects that have been funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps), replacing old heavy-duty trucks with new, cleaner, more efficient heavy-duty trucks, and replacement of old farm tractors.

In implementing a VERA, the District verifies the actual emission reductions that have been achieved as a result of completed grant contracts, monitors the emission reduction projects, and ensures the enforceability of achieved reductions. After the project is mitigated, the District certifies to the Lead Agency that the mitigation is completed, providing the Lead Agency with an enforceable mitigation measure demonstrating that project-related emissions have been mitigated. To assist the Lead Agency and project proponent in ensuring that the environmental document is compliant with CEQA, the District recommends the environmental document includes an assessment of the feasibility of implementing a VERA.

## **6) Vegetative Barriers and Urban Greening**

There are residential units located north of the Project. The District suggests the City consider the feasibility of incorporating vegetative barriers and urban greening as a measure to further reduce air pollution exposure on sensitive receptors (e.g., residential units).

While various emission control techniques and programs exist to reduce air quality emissions from mobile and stationary sources, vegetative barriers have been shown to be an additional measure to potentially reduce a population's exposure to air pollution through the interception of airborne particles and the uptake of gaseous pollutants. Examples of vegetative barriers include, but are not limited to the following: trees, bushes, shrubs, or a mix of these. Generally, a higher and thicker

vegetative barrier with full coverage will result in greater reductions in downwind pollutant concentrations. In the same manner, urban greening is also a way to help improve air quality and public health in addition to enhancing the overall beautification of a community with drought tolerant, low-maintenance greenery.

## **7) Clean Lawn and Garden Equipment in the Community**

Since the Project consists of commercial and residential development, gas-powered commercial and residential lawn and garden equipment have the potential to result in an increase of NO<sub>x</sub> and PM<sub>2.5</sub> emissions. Utilizing electric lawn care equipment can provide residents with immediate economic, environmental, and health benefits. The District recommends the Project proponent consider the District's Clean Green Yard Machines (CGYM) program which provides incentive funding for replacement of existing gas powered lawn and garden equipment. More information on the District CGYM program and funding can be found at:

<http://www.valleyair.org/grants/cgym.htm>  
and <http://valleyair.org/grants/cgym-commercial.htm>.

## **8) On-Site Solar Deployment**

It is the policy of the State of California that renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers by December 31, 2045. While various emission control techniques and programs exist to reduce air quality emissions from mobile and stationary sources, the production of solar energy is contributing to improving air quality and public health. The District suggests that the City consider incorporating solar power systems as an emission reduction strategy for the Project.

## **9) Electric Vehicle Chargers**

To support and accelerate the installation of electric vehicle charging equipment and development of required infrastructure, the District offers incentives to public agencies, businesses, and property owners of multi-unit dwellings to install electric charging infrastructure (Level 2 and 3 chargers). The purpose of the District's Charge Up! Incentive program is to promote clean air alternative-fuel technologies and the use of low or zero-emission vehicles. The District recommends that the City and project proponents install electric vehicle chargers at project sites, and at strategic locations.

Please visit [www.valleyair.org/grants/chargeup.htm](http://www.valleyair.org/grants/chargeup.htm) for more information.

## **10) District Rules and Regulations**

The District issues permits for many types of air pollution sources, and regulates some activities that do not require permits. A project subject to District rules and

regulations would reduce its impacts on air quality through compliance with the District's regulatory framework. In general, a regulation is a collection of individual rules, each of which deals with a specific topic. As an example, Regulation II (Permits) includes District Rule 2010 (Permits Required), Rule 2201 (New and Modified Stationary Source Review), Rule 2520 (Federally Mandated Operating Permits), and several other rules pertaining to District permitting requirements and processes.

The list of rules below is neither exhaustive nor exclusive. Current District rules can be found online at: [www.valleyair.org/rules/1ruleslist.htm](http://www.valleyair.org/rules/1ruleslist.htm). To identify other District rules or regulations that apply to future projects, or to obtain information about District permit requirements, the project proponents are strongly encouraged to contact the District's Small Business Assistance (SBA) Office at (559) 230-5888.

#### **10a) District Rules 2010 and 2201 - Air Quality Permitting for Stationary Sources**

Stationary Source emissions include any building, structure, facility, or installation which emits or may emit any affected pollutant directly or as a fugitive emission. District Rule 2010 (Permits Required) requires operators of emission sources to obtain an Authority to Construct (ATC) and Permit to Operate (PTO) from the District. District Rule 2201 (New and Modified Stationary Source Review) requires that new and modified stationary sources of emissions mitigate their emissions using Best Available Control Technology (BACT).

This Project may be subject to District Rule 2010 (Permits Required) and Rule 2201 (New and Modified Stationary Source Review) and may require District permits. Prior to construction, the Project proponent should submit to the District an application for an ATC. For further information or assistance, the project proponent may contact the District's SBA Office at (559) 230-5888.

#### **District Rule 9510 - Indirect Source Review (ISR)**

The Project is subject to District Rule 9510 because it will receive a project-level discretionary approval from a public agency and will equal or exceed 20,000 square feet of medical office space.

The purpose of District Rule 9510 is to reduce the growth in both NO<sub>x</sub> and PM emissions associated with development and transportation projects from mobile and area sources; specifically, the emissions associated with the construction and subsequent operation of development projects. The ISR Rule requires developers to mitigate their NO<sub>x</sub> and PM emissions by incorporating clean air design elements into their projects. Should the proposed development project clean air design elements be insufficient to meet the required emission

reductions, developers must pay a fee that ultimately funds incentive projects to achieve off-site emissions reductions.

Per Section 5.0 of the ISR Rule, an Air Impact Assessment (AIA) application is required to be submitted no later than applying for project-level approval from a public agency. As of the date of this letter, the District has not received an AIA application for this Project. Please inform the project proponent to immediately submit an AIA application to the District to comply with District Rule 9510. One AIA application should be submitted for the entire Project. It is preferable for the applicant to submit an AIA application as early as possible in the City's approval process so that proper mitigation and clean air design under ISR can be incorporated into the City's analysis.

Information about how to comply with District Rule 9510 can be found online at: <http://www.valleyair.org/ISR/ISRHome.htm>.

The AIA application form can be found online at: <http://www.valleyair.org/ISR/ISRFormsAndApplications.htm>.

District staff is available to provide assistance and can be reached by phone at (559) 230-5900 or by email at [ISR@valleyair.org](mailto:ISR@valleyair.org).

#### **10b) District Rule 9410 (Employer Based Trip Reduction)**

The Project may be subject to District Rule 9410 (Employer Based Trip Reduction) if the project would result in employment of 100 or more "eligible" employees. District Rule 9410 requires employers with 100 or more "eligible" employees at a worksite to establish an Employer Trip Reduction Implementation Plan (eTRIP) that encourages employees to reduce single-occupancy vehicle trips, thus reducing pollutant emissions associated with work commutes. Under an eTRIP plan, employers have the flexibility to select the options that work best for their worksites and their employees.

Information about District Rule 9410 can be found online at: [www.valleyair.org/tripreduction.htm](http://www.valleyair.org/tripreduction.htm).

For additional information, you can contact the District by phone at 559-230-6000 or by e-mail at [etrip@valleyair.org](mailto:etrip@valleyair.org)

#### **10c) District Rule 4002 (National Emissions Standards for Hazardous Air Pollutants)**

In the event an existing building will be renovated, partially demolished or removed, the Project may be subject to District Rule 4002. This rule requires a

thorough inspection for asbestos to be conducted before any regulated facility is demolished or renovated. Information on how to comply with District Rule 4002 can be found online at:

<http://www.valleyair.org/busind/comply/asbestosbultn.htm>.

#### **10d) District Rule 4601 (Architectural Coatings)**

The Project may be subject to District Rule 4601 since it may utilize architectural coatings. Architectural coatings are paints, varnishes, sealers, or stains that are applied to structures, portable buildings, pavements or curbs. The purpose of this rule is to limit VOC emissions from architectural coatings. In addition, this rule specifies architectural coatings storage, cleanup and labeling requirements. Additional information on how to comply with District Rule 4601 requirements can be found online at:

<http://www.valleyair.org/rules/currntrules/r4601.pdf>

#### **10e) District Regulation VIII (Fugitive PM10 Prohibitions)**

The project proponent may be required to submit a Construction Notification Form or submit and receive approval of a Dust Control Plan prior to commencing any earthmoving activities as described in Regulation VIII, specifically Rule 8021 – *Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities*.

Should the project result in at least 1-acre in size, the project proponent shall provide written notification to the District at least 48 hours prior to the project proponents intent to commence any earthmoving activities pursuant to District Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities). Also, should the project result in the disturbance of 5-acres or more, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials, the project proponent shall submit to the District a Dust Control Plan pursuant to District Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities). For additional information regarding the written notification or Dust Control Plan requirements, please contact District Compliance staff at (559) 230-5950.

The application for both the Construction Notification and Dust Control Plan can be found online at:

<https://www.valleyair.org/busind/comply/PM10/forms/DCP-Form.docx>

Information about District Regulation VIII can be found online at:

[http://www.valleyair.org/busind/comply/pm10/compliance\\_pm10.htm](http://www.valleyair.org/busind/comply/pm10/compliance_pm10.htm)



## **10f) Other District Rules and Regulations**

The Project may also be subject to the following District rules: Rule 4102 (Nuisance) and Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations).

## **11) District Comment Letter**

The District recommends that a copy of the District's comments be provided to the Project proponent.

If you have any questions or require further information, please contact Patrick Chimienti by e-mail at [patrick.chimienti@valleyair.org](mailto:patrick.chimienti@valleyair.org) or by phone at (559) 230-6139.

Sincerely,

Brian Clements  
Director of Permit Services



For: Seth Lane  
Program Manager

**From:** [Samantha McCarty](#)  
**To:** [Gabrielle Myers](#)  
**Cc:** [Shana Powers](#)  
**Subject:** RE: General Plan Amendment No. 2022-01, Rezone No. 2022-01, and Planned Unit Development No. 2022-01  
**Date:** Wednesday, November 9, 2022 4:08:09 PM

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CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Dear Gabrielle,

Thank you for contacting the Santa Rosa Rancheria Tachi-Yokut Tribe regarding: General Plan Amendment No. 2022-01, Rezone No. 2022-01, and Planned Unit Development No. 2022-01. Due to tribal history and knowledge of the area, the Tribe is requesting to have a burial treatment plan and curation agreement put in place, as well as be retained for a cultural presentation for all construction staff and to have a Native American Monitor on site during all ground disturbance. If you have any questions, comments, and or concerns please contact myself or the SRR Cultural Department. We look forward to working with you on this project. Thank you.

Sincerely,

*Samantha McCarty*

Santa Rosa Rancheria Tachi-Yokut Tribe

Cultural Specialist II

[SMcCarty@tachi-yokut-nsn.gov](mailto:SMcCarty@tachi-yokut-nsn.gov)

Office: (559) 924-1278 x 4091

Cell: (559) 633-6640

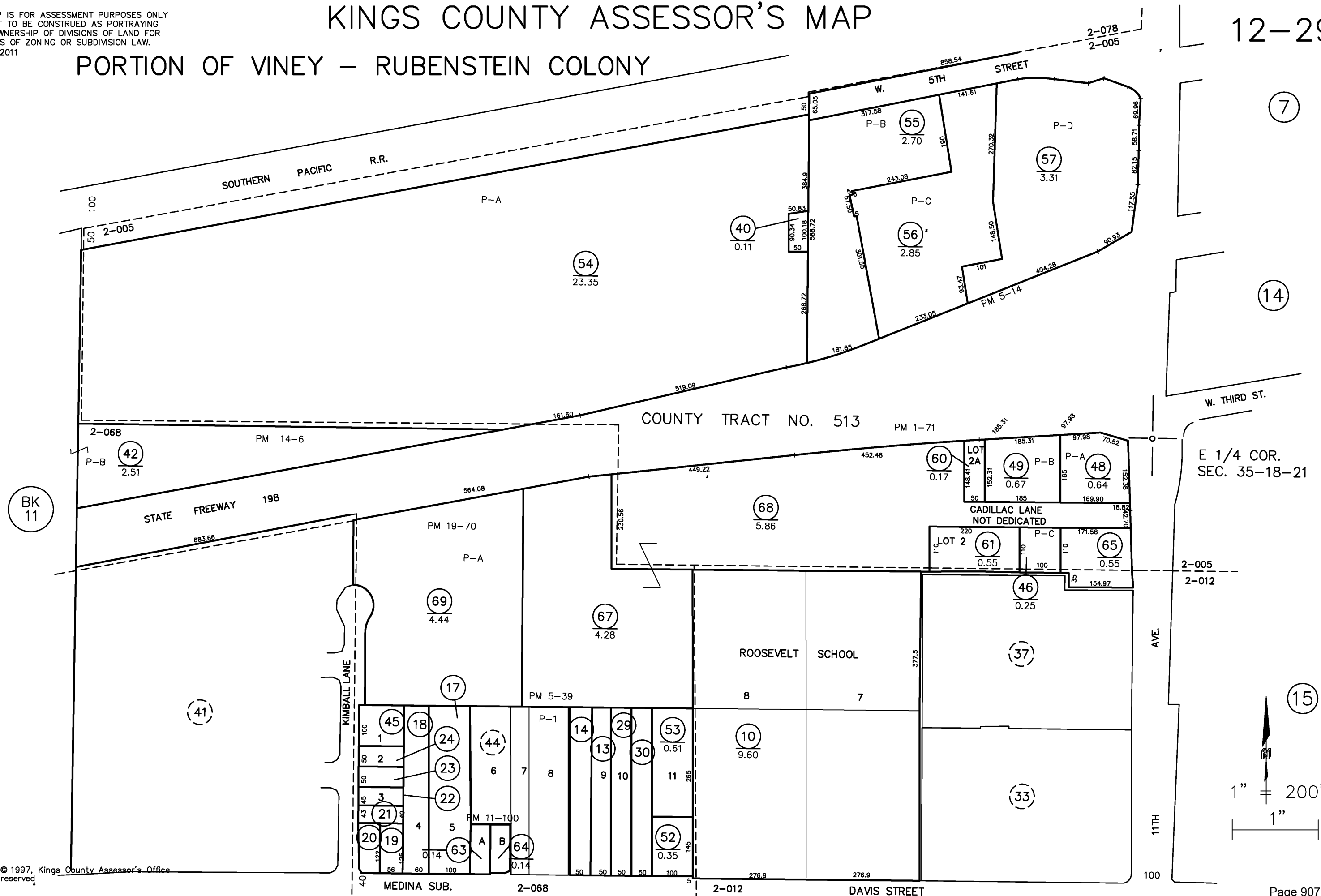
**\*PLEASE KEEP ALL CULTURAL STAFF IN EMAILS UNLESS STATED OTHERWISE**

THIS MAP IS FOR ASSESSMENT PURPOSES ONLY  
IT IS NOT TO BE CONSTRUED AS PORTRAYING  
LEGAL OWNERSHIP OF DIVISIONS OF LAND FOR  
PURPOSES OF ZONING OR SUBDIVISION LAW.  
AUGUST 2011

# KINGS COUNTY ASSESSOR'S MAP

## PORTION OF VINEY – RUBENSTEIN COLONY

12-29



THIS MAP IS FOR ASSESSMENT PURPOSES ONLY  
IT IS NOT TO BE CONSTRUED AS PORTRAYING  
LEGAL OWNERSHIP OF DIVISIONS OF LAND FOR  
PURPOSES OF ZONING OR SUBDIVISION LAW.  
MAY 2016

KINGS COUNTY ASSESSOR'S MAP  
W 1/2 SEC. 35-18-21

11-06

