LEMOORE PLANNING COMMISSION
Regular Meeting
AGENDA
Lemoore Council Chamber
429 ‘C’ Street

May 11, 2020
7:00 p.m.

1. Pledge of Allegiance

2. Call to Order and Roll Call

3. Public Comment

This time is reserved for members of the audience to address the Planning Commission on items of interest that are not on the Agenda and are within the subject matter jurisdiction of the Commission. It is recommended that speakers limit their comments to 3 minutes each and it is requested that no comments be made during this period on items on the Agenda. The Commission is prohibited by law from taking any action on matters discussed that are not on the Agenda. Prior to addressing the Commission, any handouts for Commissioners will be provided to the Planning Commission Secretary for distribution to the Commissioners and appropriate staff.

4. Approval – Minutes – Regular Meeting, April 13, 2020

5. Public Hearing – General Plan Amendment No. 2020-02, Zoning Map Amendment No. 2020-02, Planned Unit Development No. 2020-01, Tentative Subdivision Map Tract 848, and Major Site Plan Review No. 2020-01: A request by Lennar Homes for five approvals to develop a 362-lot single-family residential subdivision in three phases with a 1.1-acre park on 54.1 acres along with general plan and zoning map changes only on 23.4 acres. The project is located south of Bush Street and east of College Avenue, in the city of Lemoore (APNs: 023-510-040 and 023-480-031). A mitigated negative declaration has been prepared in accordance with the California Environmental Quality Act.

6. Director’s Report – Judy Holwell

7. Commission’s Reports and Requests for Information

8. Adjournment

<u>Upcoming Meetings</u>
Regular Meeting of the Planning Commission, June 8, 2020

Agendas for all Planning Commission meetings are posted at least 72 hours prior to the meeting at the Council Chamber, 429 C Street and the Cinnamon Municipal Complex, 711 W. Cinnamon Drive. Any writings or documents provided to a majority of the Planning Commission regarding any item on this agenda will be made available for public inspection at the Community Development Department, located at 711 W. Cinnamon Drive, during normal business hours. The City of Lemoore complies with the Americans with Disabilities Act (ADA of 1990). The Council Chamber is accessible to the physically disabled. Should you need special assistance, please call (559) 924-6744, at least four (4) business days prior to the meeting.

CERTIFICATION OF POSTING

I, Kristie Baley, Planning Commission Secretary for the City of Lemoore, do hereby declare that I posted the above Planning Commission Agenda for the Regular Meeting of Monday, May 11, 2020 at 7:00 p.m. at the Cinnamon Municipal Complex, 711 W. Cinnamon Drive in accordance with applicable legal requirements.

Posted this 8th day of May 2020.

//s//

Kristie Baley, Planning Commission Secretary

CITY OF LEMOORE
ALL PLANNING COMMISSION REGULAR AND SPECIAL MEETINGS

Attendance and Public Comment Changes Due to COVID-19

Given the current Shelter-in-Place Order covering the State of California and the Social Distance Guidelines issued by Federal, State, and Local Authorities, the City is implementing the following changes for attendance and public comment at all Planning Commission meetings until notified otherwise.

All upcoming regular and special Planning Commission meetings will ***only be accessible online***. The meeting may be viewed through the following options:

- Youtube: www.Youtube.com/c/cityoflemoore

The City will also provide links to streaming options on the City's website and on its Facebook page. Unfortunately, physical attendance by the public cannot be accommodated given the current circumstances and the need to ensure the health and safety of the Planning Commission, City staff, and the public as a whole.

If you wish to make a general public comment or public comment on a particular item on the agenda, ***you must submit your public comments by e-mail to***: planning@lemoore.com. In the subject line of the e-mail, please state your name and the item you are commenting on. If you wish to submit a public comment on more than one agenda item, please send a separate e-email for each item you are commenting on. Please be aware that written public comments, including your name, may become public information. Additional requirements for submitting public comments by e-mail are provided below.

General Public Comments & Comments on Planning Commission Business Items

For general public comments and comments regarding specific Planning Commission Business Items, all public comments must be received by e-mail no later than 5:00 p.m. the day of the meeting. Comments received by this time will be read aloud by a staff member during the applicable agenda item, provided that such comments may be read within the normal three (3) minutes allotted to each speaker. Any portion of your comment extending past three (3) minutes may not be read aloud due to time restrictions. If a general public comment or comment on a business item is received after 5:00 p.m., efforts will be made to read your comment into the record. However, staff cannot guarantee that written comments received after 5:00 p.m. will be read. All written comments that are not read into the record will be made part of the meeting minutes, provided that such comments are received prior to the end of the Planning Commission meeting.

Public Hearings

For public comment on a public hearing, all public comments must be received by the close of the public hearing period. All comments received by the close of the public hearing period will be read aloud by a staff member during the applicable agenda item, provided that such comments may be read within the normal three (3) minutes allotted to each speaker. Any portion of your comment extending past three (3) minutes may not be read aloud due to time restrictions. If a comment on a public hearing item is received after the close of the public hearing, such comment will be made part of the meeting minutes, provided that such comment is received prior to the end of the meeting.

PLEASE BE AWARE THAT ANY PUBLIC COMMENTS RECEIVED THAT DO NOT SPECIFY A PARTICULAR AGENDA ITEM WILL BE READ ALOUD DURING THE GENERAL PUBLIC COMMENT PORTION OF THE AGENDA.

The City thanks you for your cooperation in advance. Our community's health and safety is our highest priority.

Minutes of the
LEMOORE PLANNING COMMISSION
Regular Meeting
April 13, 2020

ITEM NO. 1 Pledge of Allegiance

ITEM NO. 2 Call to Order and Roll Call

The meeting was called to order at 7:00 PM.

Chair:	Etchegoin
Vice Chair:	Koelewyn
Commissioners:	Clement, Dey, Franklin *via conference call,* Meade
Absent:	Boerkamp

City Staff and Contract Employees Present: Community Development Director Holwell, City Attorney Carlson (Lozano Smith) *via conference call*, Commission Secretary Baley

ITEM NO. 3 Public Comment

Community Development Director Holwell read a letter of resignation from Commissioner Boerkamp, effective April 13, 2020

There was no other comment.

ITEM NO. 4 Approval – Minutes – Regular Meeting, March 9, 2020

Motion by Commissioner Clement, seconded by Commissioner Koelewyn, to approve the Minutes of the Planning Commission Regular Meeting of March 9, 2020.

Ayes: Clement, Koelewyn, Dey, Franklin, Meade, Etchegoin
Absent: Boerkamp

ITEM NO. 5 Public Hearing – to accept public comment for Conditional Use Permit No. 2020-01: a request by Ayla Tidwell to operate an indoor/outdoor beer and wine bar/lounge. The site is located at 212 W. D Street (APN 020-053-007).

Community Development Director Holwell presented the staff report and answered questions from Commissioners.

Applicant Ayla Tidwell answered Commissioners questions via conference call.

Chair Etchegoin opened the public hearing at 7:15 p.m.

Holwell read an email received from Lemoore Downtown Merchant Board Member, Dr. Jeff Garcia of Family Eye Care at 126 W. D Street, Lemoore. The email in support of the beer and wine bar/lounge received by Planning on March 7, 2020 was entered into record.

Applicant Ayla Tidwell introduced herself via conference call and thanked staff for their assistance throughout the process and for making the meeting happen.

There was no other comment.

Chair Etchegoin closed the public hearing at 7:19 p.m.

Motion by Commissioner Meade, seconded by Commissioner Dey to adopt Resolution No. 2020-04 approving Conditional Use Permit No. 2020-01 subject to the conditions in the resolution.

Ayes: Meade, Dey, Clement, Franklin, Koelewyn, Etchegoin
Absent: Boerkamp

ITEM NO. 7 Director's Report

Community Development Director Holwell provided information regarding:

The first reading of the McCann request for general plan amendment and zone map amendment went before the City Council on April 7th and the second reading is expected to be on the April 21st City Council agenda for approval.

The Master Storage lot line adjustment has been approved by Planning and the project should be moving forward soon.

The Dutch Brothers lot line adjustment has been approved by Planning and is moving forward.

The Lennar Homes request for 362 unit housing project to be located just east of West Hills College near the ponding basin and solar farm is expected to be presented during the May 11, 2020 Planning Commission meeting. A Mitigated Negative Declaration prepared by QK, Inc. has been sent to the State Clearing House who in turn sends it out to all public agencies and the City has notified the Tachi Yokut Tribe. There is a 30 day review period for the CEQA document and staff will review any responses received prior to the meeting and include them in the staff report when bringing the item to the Commission.

The Assemi Group request for 156 acre housing project to be located at 18th and Glendale is currently being processed by staff. The project will include approximately 550 single family units and a 4.5 acre portion for multi-family units. Because the project will require an environmental impact review (EIR), which is a much more intense environmental review, the project is not expected to be brought to the Commission prior to the beginning of next year.

The City is requiring that both the Lennar Homes and Assemi Group developments include multi-family housing to satisfy Lemoore's Housing Element requirements.

The property north of West Hills College that Granville Homes was expected to develop several years ago is still available for a multi-family development, as Granville did not purchase the property after all.

ITEM NO. 8 – Commission's Reports and Requests for Information

Chair Etchegoin notified Commissioners that Myeisha, wife of Mayor Eddie Neal passed away this morning.

ITEM No. 9 – Adjournment

The meeting adjourned at 7:30 P.M.

Approved the 11th day of May 2020.

APPROVED:

____
Ray Etchegoin, Chairperson

ATTEST:

____
Kristie Baley, Commission Secretary

City of
LEMOORE
CALIFORNIA

711 W. Cinnamon Drive ● Lemoore, California 93245 ● (559) 924-6744

Staff Report

To: **Lemoore Planning Commission** **Item No. 5**

From: **Steve Brandt, City Planner**

Date: **May 7, 2020** **Meeting Date:** **May 11, 2020**

Subject: **General Plan Amendment No. 2020-02, Zoning Map Amendment No. 2020-02, Planned Unit Development No. 2020-01, Tentative Subdivision Map Tract 848, and Major Site Plan Review No. 2020-01:** A request by Lennar Homes for five approvals to develop a 362-lot single-family residential subdivision in three phases with a 1.06-acre park on 54.1 acres along with general plan and zoning map changes only on 23.4 acres. The project is located south of Bush Street and east of College Avenue, in the city of Lemoore (APNs: 023-510-040 and 023-480-031). A mitigated negative declaration has been prepared in accordance with the California Environmental Quality Act.

- General Plan Amendment No. 2020-02 is a request to change the General Plan land use designations on the site from Low Density Residential, Low-Medium Density Residential, Mixed Use, and Parks/Recreation to Low Density Residential, Low-Medium Density Residential, Medium Density Residential, and Neighborhood Commercial. The land proposed for Medium Density Residential and Neighborhood Commercial would be constructed in a future phase.

- Zoning Map Amendment 2020-02 is a request to change the zoning on the site from Low Density Residential (RLD), Low-Medium Density Residential (RLMD), Mixed Use (MU), and Parks/Recreation (PR) to Low Density Residential (RLD), Low-Medium Density Residential (RLMD), Medium Density Residential (RMD), and Neighborhood Commercial (NC). The land proposed for Medium Density Residential and Neighborhood Commercial would be constructed in a future phase.

- Planned Unit Development No. 2020-01 is a request to approve new residential lots with a minimum 4,000 sq.ft. in lot size and minimum 12-foot front building setback from the property line to the living space, with the exception of one floor plan with a minimum 10-foot front building setback to the living space. The project will also provide a trail and landscaping over the existing high-pressure gas pipeline easement between College Avenue and Bush Street.

- Tentative Subdivision Map Tract 848 is a request to approve a 362-lot single-family subdivision in three phases with a 1.06-acre park. Access would be from College Avenue, the new alignment of Semas Drive, and the new alignment of Pedersen Street. Phase 1 will consist of 152 dwelling units, Phase 2 will consist of 107 dwelling units, the trail and the park, and Phase 3 will consist of 103 dwelling units. A future phase (remainder) will consist of a multifamily and neighborhood commercial project.

- Major Site Plan Review No. 2020-01 is a request to approve the site plan of the project including a 362-lot subdivision, 1.06-acre park, adjacent street construction or widening of portions of Bush Street, College Avenue, the new alignment of Semas Drive, and the new alignment of Pedersen Street. The land proposed for Medium Density Residential and Neighborhood Commercial would not be constructed in this phase.

Proposed Motion:

Following the duly noticed Public Hearing, move to adopt Resolution No. 2020-05, recommending approval of General Plan Amendment No. 2020-02, Zoning Map Amendment 2020-02, Planned Unit Development No. 2020-01, Tentative Subdivision Map Tract 848, and Major Site Plan Review No. 2020-01 in accordance with the findings and conditions in the resolution.

Recommendation:

Staff has prepared one resolution recommending approval of the mitigated negative declaration and the five requests that make up the project. Because the public review period for the CEQA document needed to run through May 12, it should be noted that after the Planning Commission recommends approval of the mitigated negative declaration, additional comments could be received from outside agencies, resulting in amendments to the mitigated negative declaration. If this occurs, Staff will specifically draw the Council's attention to the changes at the City Council hearing. The resolution contains Staff's recommended findings and conditions. A draft of the resolution is attached. After the hearing, the Commission may add, delete, or modify the conditions before voting on the project. The Planning Commission decision is a recommendation to the City Council. The Planning Commission's recommendation will be brought to the City Council at a public hearing for final approval of all aspects of the project.

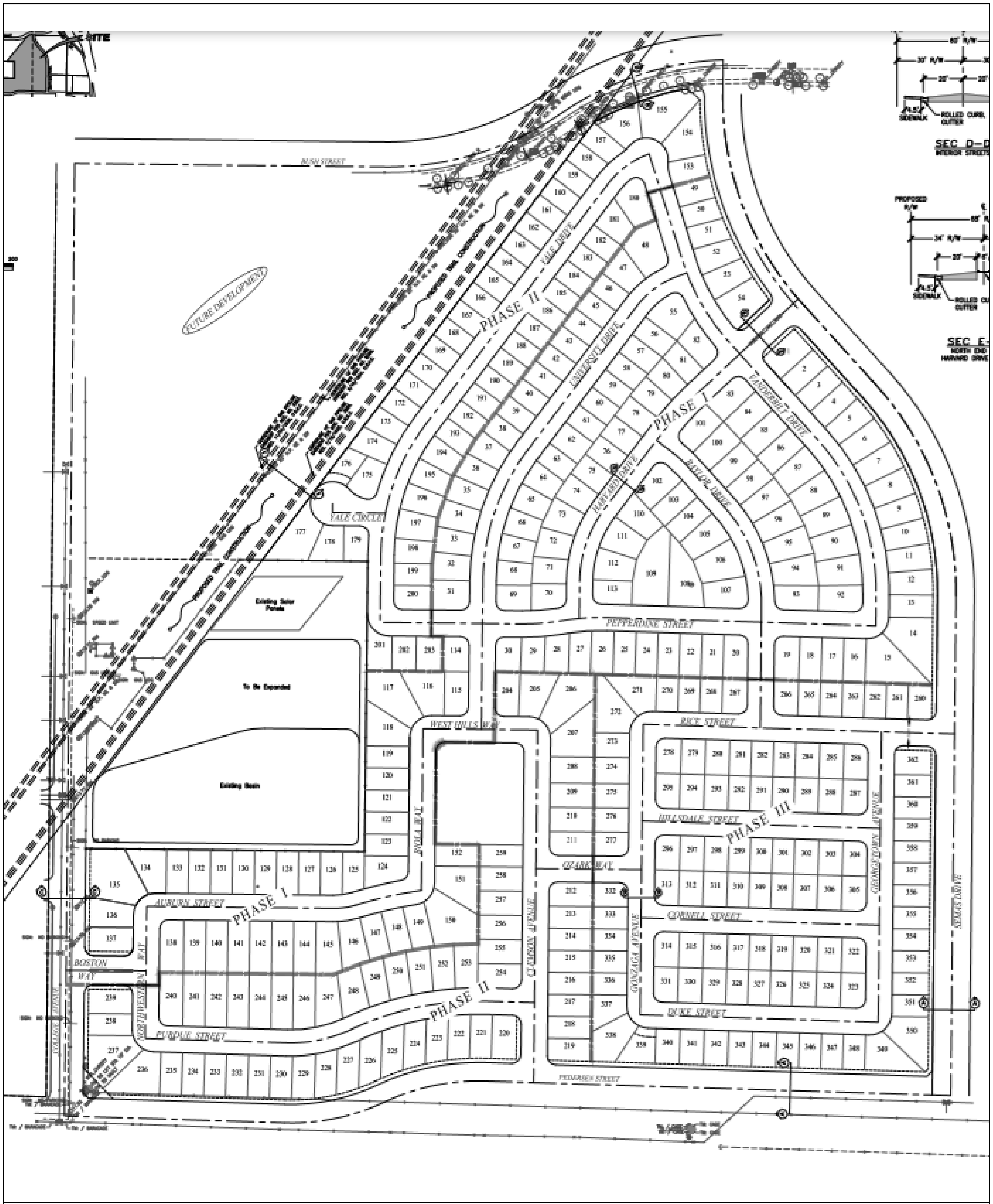
Project Proposal:

This project is requesting approval of Tract No. 848 for 362 lots along with the single-family home master plans. The currently existing ponding basin would be expanded to support the project site, a park, and a landscaped trail. The project would be constructed in three planned phases. Lot sizes range from 4,000 square feet to 12,315 square feet, with an average lot size of 5,138 square feet. The proposed map is shown on page 5 of this report; a version of the full tentative map is attached. The applicant has submitted elevations and floor plans for nine home plans that will be built on the lots. Eight of the nine elevation plans have three different elevation types, and one has two elevation types. All elevations have similar roof lines. The plans are attached at the end of this report.

Future development on the remainder parcel west of the high-pressure gas lines, which is intended for multifamily and neighborhood commercial development, is not considered in this review. Approval of this portion of the site (which will be a remainder parcel on the tentative map) only entails the approval of the zone change for the remainder phase. When the remainder parcel is up for development, the specific development proposal will need to be reviewed.

Applicant	Lennar Homes
Location	Directly east of West Hills College Lemoore, bounded by Bush Street to the north, Semas Drive to the east, Pedersen Street to the south, and College Avenue to the west.
Existing Land Use	Vacant Land
APN(s)	023-510-040 and 023-480-031
Home Size	Min. 1,103 sq.ft. – Max. 2,985 sq.ft.
Lot Size	Min. 4,000 sq.ft. – Max. 12,315 sq.ft.
Current Zoning	Mixed Use (MU), Parks and Recreation/Ponding Basin (PR), Low Density Residential (RLD), Low-Medium Density Residential (RLMD)
Proposed Zoning	Neighborhood Commercial (NC), Low Density Residential (RLD), Low-Medium Density Residential (RLMD), Medium Density Residential (RMD)
Current General Plan	Mixed Use, Parks & Recreation, Low Density Residential, Low-Medium Density Residential
Proposed General Plan	Neighborhood Commercial, Low Density Residential, Low-Medium Density Residential, Medium Density Residential

Site Location – Aerial Photo
Tract No. 848



Proposed Tentative Subdivision Map
Tract No. 848 (full map in attachments)

Adjacent Land Use, Zones, and General Plan Designations:

Direction	Current Use	Zone	General Plan
North	Fallow land	RMD	Medium Density Residential
South	Fallow land	CF	Community Facilities
East	Fallow land	RC and RLMD	Regional Commercial and Low-Medium Density Residential
West	West Hills College	CF	Community Facilities

Previous Relevant Actions:

The area west of State Route 41 and surrounding West Hills College, commonly referred to as the Westside, was annexed into the city limits of Lemoore in 2000. The project site is Parcel 10 of Parcel Map No. 2005-03, approved in 2005.

Zoning and General Plan

The site is designated Mixed Use, Parks & Recreation, Low Density Residential, and Low-Medium Density Residential by the General Plan. This project includes changing the General Plan land use designations to Neighborhood Commercial, Low Density Residential, Low-Medium Density Residential, and Medium Density Residential. The current and proposed General Plan maps can be found on pages 7 and 8 of this report.

As for zoning designations, the site is zoned Low Density Residential (RLD), Low-Medium Density Residential (RLMD), Mixed Use (MU), and Parks/Recreation (PR). To be consistent with the General Plan, the zoning designations would be changed to Neighborhood Commercial (NC), Low Density Residential (RLD), Low-Medium Density Residential (RLMD), and Medium Density Residential (RMD).

Existing General Plan Land Use Designations

Proposed General Plan Land Use Designations

New Housing Law Prohibiting Downzoning

On October 9, 2019, Governor Newsom signed into law Senate Bill 330, the housing Crisis Act of 2019. Among other mandates, a city cannot enact a development policy, standard, or condition that would change the land use designation or zoning of a parcel or parcels of property to a less intensive use or reduce intensity of the land use within an existing zoning district below what was allowed under the general plan land use designations and zoning ordinances of the city that were in effect on January 1, 2018. The goal is to promote more new housing construction at greater densities. What this means is that the City cannot approve a general plan amendment or zone change that would lower the planned density of a site.

Due to the new implementation of the law, staff conducted an analysis to see if this project was reducing the intensity of the land use. (There have been no changes since January 1, 2018, that would have affected housing density.) After making some adjustments to the project that were agreed to by the applicant, Staff analysis concluded that the density level of the current zoning would not decrease upon the implementation of the new zoning designations. Analysis can be seen in the table on page 10 of this report.

The first part of the table shows that the Lemoore Housing Element anticipated a total of 479 housing units for the entire project site. Note that the subdivisions map covers 54.1 acres. The remaining acreage west of the gas pipeline easements are not being developed at this time but are being adjusted in the General Plan and on the Zoning Map to maintain the same number of planned units. The second part of the table shows that after the General Plan Amendment only, the estimated housing units would remain at 479 units. The third part of the table shows that after the General Plan Amendment and the subdivision map are approved; the estimated number of housing units would continue to remain at 479 units.

Housing Density Analysis Table

Zone Name	Acres	Housing Element Realistic Density	HE Lower	HE Mod	HE Above Mod	Total Housing
EXISTING PLANNED DENSITY						
Mixed Use east of pipeline	7.28	9.00	66	0	0	**66**
Parks & Recreation/ Ponding Basin	8.16	0.00	0	0	0	**0**
Low Density Residential	29.41	4.50	0	66	66	**132**
Low-Medium Density Residential	20.12	9.00	0	91	91	**182**
Mixed Use west of pipeline	11.05	9.00	99	0	0	**99**
Parks & Recreation/ Ponding Basin	1.03	0.00	0	0	0	**0**
TOTAL PER CURRENT PLANNED DESIGNATIONS	77.05		165	157	157	**479**
PLANNED DENSITY AFTER GENERAL PLAN AMENDMENT ONLY						
Low Density Residential east of pipelines	49.10	4.50	0	110	110	**220**
Low-Medium Density Residential east of pipeline	15.87	9.00	0	71	71	**142**
Medium Density Residential west of pipeline	8.38	14.00	117	0	0	**117**
Neighborhood Commercial west of pipeline	3.70	0.00	0	0	0	**0**
TOTAL PER REVISED PLANNED DESIGNATIONS	77.05		117	181	181	**479**
DENSITY WITH PROPOSED TENTATIVE MAP AFTER GENERAL PLAN AMENDMENT						
Low Density Residential east of pipeline (as proposed)	49.10	5.57	0	111	148	**259**
Low-Medium Density Residential east of pipeline	15.87	6.49	0	103	0	**103**
Medium Density Residential west of pipeline	8.38	14.00	117	0	0	**117**
Neighborhood Commercial west of pipeline	3.70	0.00	0	0	0	**0**
TOTAL AS PROPOSED BY TENTATIVE MAP	77.05		117	214	148	**479**

Tentative Map

The Tentative Subdivision Map submitted by the applicant includes 362 total lots, to be developed in three phases of development. The streets surrounding the area are Bush Street, College Avenue, Pedersen Street, and Semas Drive. According to the Circulation Element of the General Plan, Bush Street and College Drive are existing arterial streets, and Pedersen Street and Semas Drive are proposed arterial streets. Arterials should have 84-100 feet of right of way. The applicant's Tentative Map complies with this City standard. The map includes cross sections to show how each road will be constructed. A condition of approval recommends these exterior roads be constructed in the following phases:

- In Phase 1, Bush Street from Semas Drive to the most westerly gas pipeline easement, Semas Drive between Bush Street and the south side of Harvard Drive, and College Avenue between the south side of Boston Way and most northerly gas pipeline easement.

- In Phase 2, College Avenue from Boston Way to Pedersen Street, and Pedersen Street from College Avenue to the east side of Lot 219.

- In Phase 3, Pedersen Street from the east side of Lot 219 to Semas Drive, and Semas Drive from the south side of Harvard Drive to Pedersen Street.

According to the General Plan, arterial streets are designed to move large volumes of traffic between highways and other arterials in Lemoore and to adjacent jurisdictions. Bush Street, College Avenue, Pedersen Street, and Semas Drive are all minor arterials. Minor arterials provide mobility through the City and access to major residential, employment, and activity centers. Minor arterials provide two lanes and striped bike lanes in the street. Driveway access is minimized, consistent with the primary function of arterials to move through traffic. Landscaped parkway strips and sidewalks are accommodated within the right of way of minor arterials.

College Drive or College Avenue

While reviewing this project, Staff noted that while the General Plan refers to the arterial street on the west side of the project as College Drive, the official name given when the street was constructed was College Avenue. College Avenue is more consistent with the City's standard street naming requirements. Since this project includes a General Plan Amendment, Staff is recommending that the GPA also identify that the General Plan is hereby amended to refer to the street as College Avenue.

Major Site Plan Review

As stated before, the project will be constructed in three phases. The descriptions of the phases are:

Phase 1: This phase will involve the development of 152 lots. Sixty (60) of the lots that will be 50 feet wide and 80 feet deep (50' x 80'), creating sixty (60) 4,000-square-foot lots. The other 92 lots will be 50 feet wide and 100 feet long (50' x 100'), creating ninety-two (92) 5,000-square-foot lots. Phase 1 will be developed along Semas Drive (the eastern portion of the site), from Bush Street in the north to Pepperdine Street to the south and developing

Vanderbilt Drive, Baylor Drive, Harvard Drive, and University Drive. Phase 1 will continue in a southwestern fashion, developing half of West Hills Way, all of Biola Way, all of Auburn Street, half of Northwestern Way, and all of Boston Way.

Phase 2: This phase will involve the development of 107 lots. Fifty-one (51) of the lots will be 50 feet wide and 80 feet long (50' x 80'), creating fifty-one (51) 4,000-square-foot lots. The other 56 lots will be 50 feet wide and 100 feet long (50' x 100'), creating fifty-six (56) 5,000-square-foot lots. Phase 2 will be developed along Yale Drive and continue south to Yale Circle and Pepperdine Street. It will also be developed on the east half of West Hills Way and continue south along Clemson Avenue, one half of Ozark Way, Purdue Street, and the south half of Northwestern Way. Pedersen Street will also be developed from the east end of Lot 219 west to College Avenue. (A 1.06-acre park is shown on the map in Phase 2. Staff is recommending in this report that it be constructed in Phase 1. A proposed trail is shown on the map. Staff is recommending in this report that it be constructed in Phase II.)

Phase 3: This phase will consist entirely of 4,000-square-foot lots that will be 50 feet wide and 80 feet long (50' x 80'). There will be 103 lots that will be built in the southeastern corner of the project site, along the southern portion of Semas Drive. Rice Street will be built, along with Hillsdale Street, Cornell Street, Duke Street, Gonzaga Avenue, Georgetown Avenue, and the eastern half of Ozark Way. Upon completion of the three phases, the project will consist of two different types of home plans, one set for the 50'x80' lots and another set for the 50'x100' lots.

The Major Site Plan Review No. 2020-01 comments are attached. Except as noted in the comments, the proposed map is consistent with City standards for new subdivisions.

Vehicular and Pedestrian Access

There will be four vehicular and pedestrian access points into the neighborhood when all three phases are complete: from Semas Drive onto Harvard Drive, from Semas Drive onto Rice Street, from Pedersen Street onto Clemson Avenue, and from College Avenue onto Boston Way. Two of these access points will be constructed in Phase 1, one will be constructed in Phase 2, and one will be constructed in Phase 3. There will also be a pedestrian access point from the new pedestrian/bike trail to the Yale Circle cul-de-sac.

According to the traffic study prepared for the CEQA document, traffic mitigation measures are required at the Bush Street/College Avenue intersection and at the Bush Street/Semas Drive intersection with the first phase of development. These mitigation measures take into account existing traffic, the expected traffic from other projects along Bush Street that the City has already approved but have not yet been constructed, and Phase 1 of this project. The traffic study recommends the following at Bush Street and College Avenue: convert northbound approach to a shared left-through lane and a separate right-turn lane, convert eastbound approach to a shared left-through and a shared through-right lane, and convert westbound approach to a separate left-turn lane, one through lane, and a shared through-right lane. The traffic study recommends the following at Bush Street and Semas Drive: convert the eastbound approach to a separate left-through lane and a separate through-right lane, and convert the westbound approach to a separate left-through lane and a separate through-right lane.

Off-site Traffic Improvements

According to the traffic study prepared for the CEQA document, off-site traffic mitigation measures include required improvements to the State Route 41 / Bush Street interchange as well as the Bush Street / Belle Haven Drive intersection. The traffic study recommended traffic signals or roundabouts. Staff have been working with Caltrans (who reviewed the traffic study before it was made public) about the use of temporary roundabouts at the interchange and intersection. A temporary roundabout is shaped similarly and operates similarly as a permanent roundabout, but it uses road striping and barriers instead of curbing to define the travel lanes. The purpose for only requiring temporary improvements at this time is to keep the cost down until such time that traffic counts warrant permanent improvements, and the City has time to grow its streets and thoroughfares fund when additional development occurs.

The plan being studied by Caltrans for acceptance is to construct two temporary roundabouts at the two on-ramp/off-ramp intersections and then to make the Bush/Belle Haven intersection a two-way stop intersection, so that stopped traffic does not back up into the roundabouts. There would be no stops for westbound traffic west of 19 ½ Avenue.

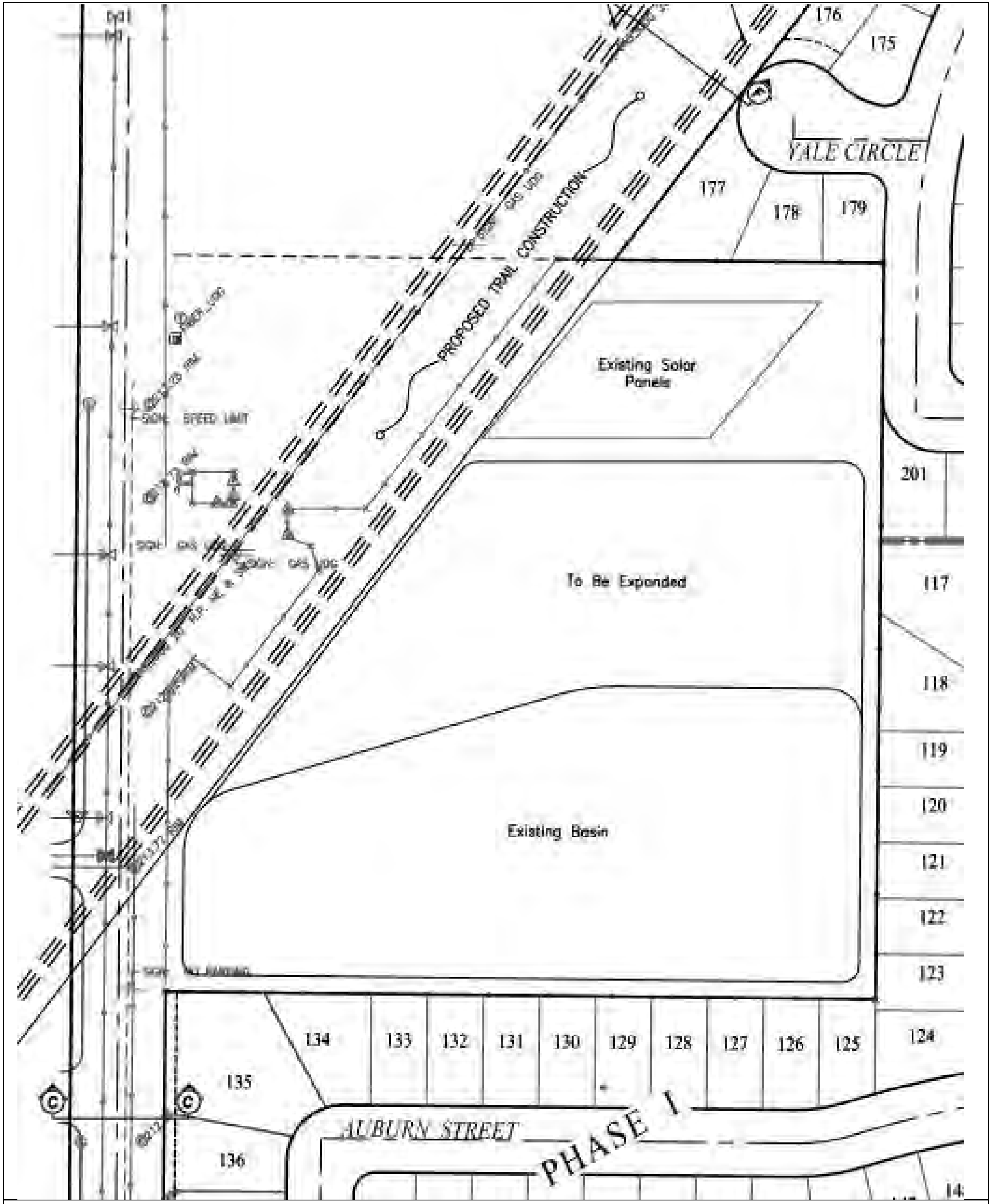
Storm Drainage Basin

The site is planned to drain to an existing basin in the western portion of the site. The existing basin is to be expanded to accommodate the stormwater runoff from the subdivision, as seen in the exhibit on page 14 of this report. Specific requirements for storm drainage improvements are in the site plan review comments.

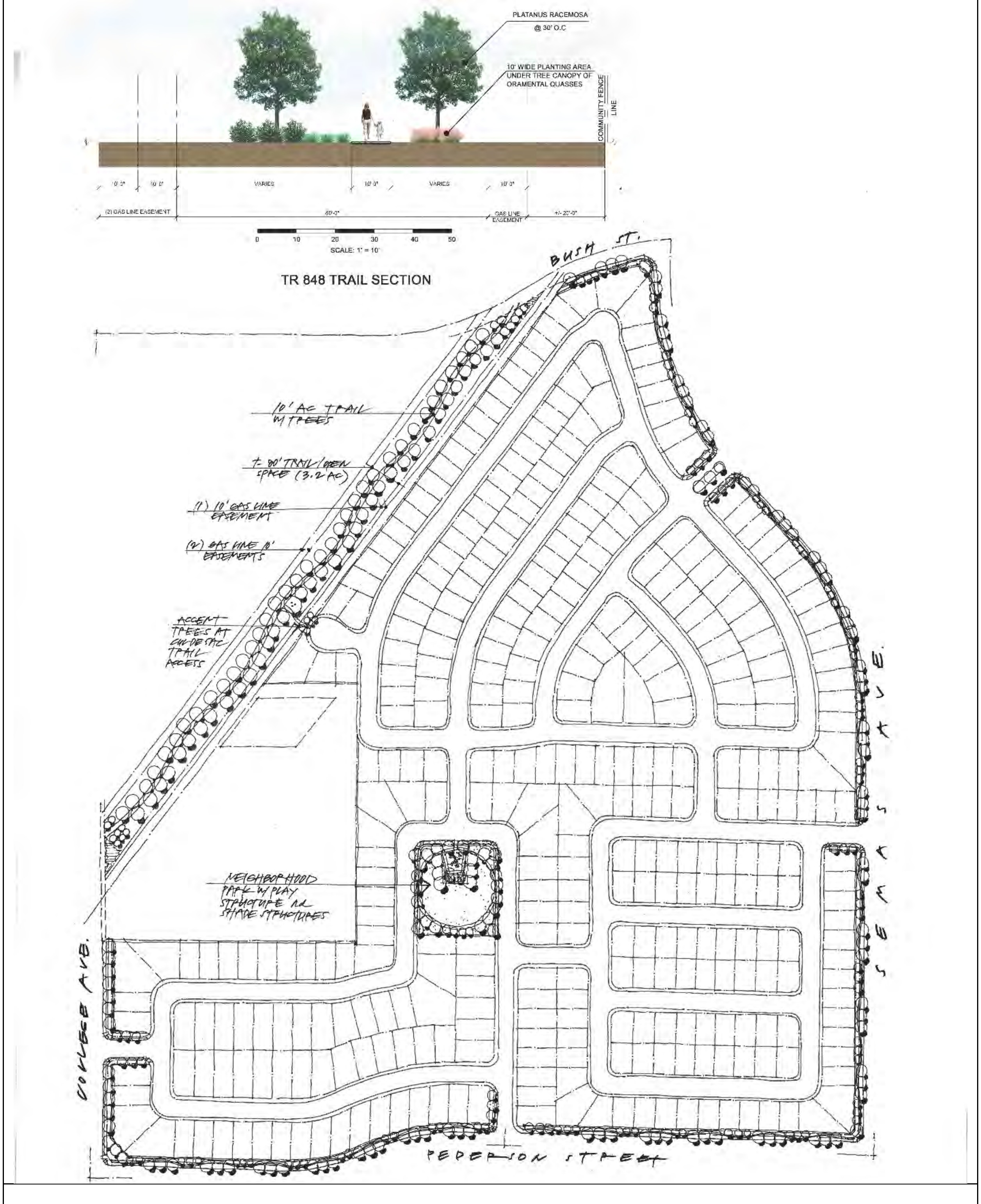
Park

A 1.06-acre park will be built to City standards by the developer and dedicated to the City. Maintenance shall be funded through a public facilities maintenance district (PFMD). Staff is recommending a condition that the park, including playground amenities, be completed and opened for use by the public prior to the final inspection on the 5th home in Phase 1 of the project, not including model homes. A conceptual plan of the park is shown on page 15 of this report, which includes playground equipment and shade structures.

City Ordinance requires 0.016 acres per single-family lot to be dedicated with a new subdivision. The 362 lots require 5.79 acres of park acreage. Based on the Tentative Map, 1.06 acres are being provided. The plan also proposes a trail, cutting through the northwestern portion of the project. The landscaped acreage of the trail will be included in the calculation of the total acreage of park required. The gas pipeline easement area to be landscaped is 130 feet wide when measured from the back of the lots to the west boundary of the western-most pipeline easement. The estimated acreage of the 130-foot wide trail is 4.9 acres. Therefore, the total acreage of park (park and trail) is estimated at 5.96 acres. (The final acreage will be determined based on the Final Map.) If the actual landscaped acreage of the park and the trail is less than 5.79 acres, the remaining acreage required shall be provided through an in-lieu fee with the amount based on an appraisal made by a certified general real estate appraiser in accordance with City Ordinance Section 8-7N-4.



Ponding Basin



Conceptual Landscape Plan

Major Gas Pipelines and Trail

There are three major PG&E gas pipelines that run diagonally in a corridor northwest of the proposed subdivision. The pipelines cross both College Avenue and Bush Street. Each of the three pipelines was constructed within a 10-foot wide easement. The General Plan designates this corridor as Greenway/Detention Basin.

The pipeline easement runs in a southwesterly direction behind lots 157 to 177 and continues to College Avenue. The total width of the easement is 130 feet. To illustrate a cross-section of the easement, the first 10-foot wide pipeline easement established in 1935, begins 20 feet west of the indicated lots. It is followed by an 80-foot strip that would contain the bike/walking trail. Then there are two additional 10-foot wide pipeline easements (20 feet total), which were established in 1954 and 1939. The trail will be landscaped between the Bush Street right of way and the College Avenue right of way. Some of the easement area is on the applicant's property and some is on the City-owned storm drain basin property. The entire area would be included in the PFMD. The three pipeline easements are shown on the Tentative Map.

A walking/bike trail was planned in the General Plan for the area between the gas pipeline easements. This is shown on page 15 of this report. The new trail would start at, and connect to, the existing trail along the south side of Bush Street and extend in a southwesterly direction to the east side of College Avenue. Staff recommends that the trail, or a sidewalk, continue south along the east side of College Avenue to connect to the subdivision's sidewalk system at lot 135. For safety, signs will be installed at both ends of the trail indicating trail ending and/or beginning of roadway. The trail would also have a pedestrian connection to the sidewalk around the Yale Circle cul-de-sac between Lots 176 and 177. A wrought iron fence (or equivalent material acceptable to the Community Development Director) shall be constructed to City standards to separate the subdivision lots from the trail.

Planned Unit Development

The RLD (Low Density Residential) zone has a minimum lot size standard of 7,000 square feet as shown in the Lemoore Municipal Code (LMC), Table 9-5A-4A. The applicant has proposed modifications to the development standards, which can be obtained through the approval of a Planned Unit Development (PUD) (LMC, Title 9, Chapter 9), and would be conditioned on the future adoption of an ordinance by the City Council establishing an overlay zone for the PUD. The proposed PUD would modify those standards to allow smaller sized lots. The smallest lot would be 4,000 square feet.

The RLD zone has standard building setback requirements as follows: 18 feet front for living space, 20 feet front for garage, 5 feet side (interior) for single-story homes, 10 feet side (interior) for two-story homes, 15 feet street side, 10 feet rear for single-story homes, and 15 feet rear for two-story homes, as shown in the Lemoore Municipal Code 9-5A-4A. The RLMD (Low-Medium Density Residential) zone has a minimum front setback of 20 feet, and the same side and rear setbacks as the RLD zone with the exception that the additional 5-foot setback is not required for two-story homes.

The applicant has proposed that the PUD modify the standards to change the required minimum setbacks for this subdivision only. The minimum front setback would be 12 feet to the living space instead of 18 feet. The minimum setback for front facing garage will remain 20 feet, the side setback will be 5 feet for both single- and two-story homes, and the rear setback will remain at 10 feet and 15 feet. There would need to be an exception for Plan 7512 (Olive) because it would not fit on an 80-foot deep lot with a 12-foot front setback and a 10-foot rear setback. An illustration of the applicant-proposed setbacks can be found on page 18 of this report and in the attached exhibits "Typical Setbacks for 50'x80' lots" and "Typical Setbacks for 50'x100' lots".

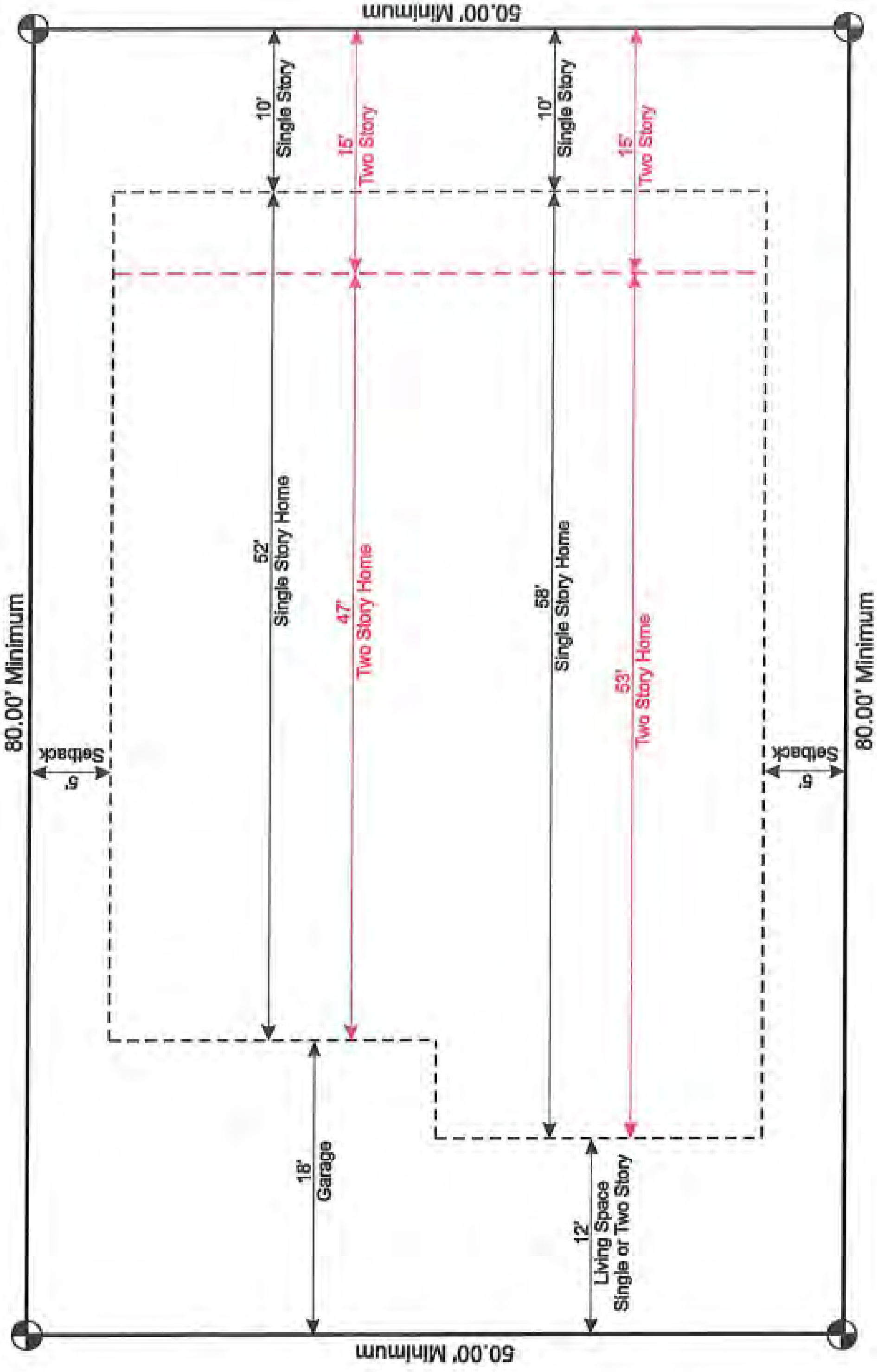
The trend of smaller lots with smaller setbacks started when new home prices increased dramatically in the mid 2000's as a way of providing more affordable housing. This trend appears to have been accepted by a large enough segment of the market that builders are continuing it. The State's emphasis on higher densities and more housing is consistent with this trend. Staff estimates that the proposed project will provide about 30 to 40 more homes than a project that was designed to meet the standard lot size and setbacks.

Staff reviewed the home plans and the proposed setbacks. For some homes the garage would be the factor determining the front setback and for other homes the living space would be the determining factor. This will result in staggered setbacks along the street, a design feature that is required. The proposed setbacks are also compared with the existing setbacks in the following table. The smaller setbacks also allow homes to be built on smaller lots, which increases the total number of homes that can be built in the neighborhood and follows a homeowner market preference for smaller sized yards that require less maintenance. Therefore, Staff supports the reduced setbacks for this neighborhood and these home plans, with some modifications described below and shown in the table on page 19 of this report.

Specifically, regarding Plan 7512, Staff is concerned that the 10-foot minimum setback will be too short if the home was placed on a corner lot less than 84 feet deep. Because the property line of corner lots are curved, placing a home at 10 feet front the from property line would place the corner of the house very close to the sidewalk curb ramp and could limit visibility around the corner. Staff recommends a modification that would not allow the Plan 7512 on corner lots less than 84 feet deep. Staff further recommends that the 10-foot front setback for Plan 7512 be limited only to lots less than 84 feet deep.

Staff supports the reduction in the side yard setbacks for two-story homes to 5 feet. However, 5 feet of width does make it more difficult to maneuver the three waste containers that each home will have. Staff recommends a condition that a 4'x12' concrete pad be constructed behind the fence gate on all homes to encourage homeowners to store their containers behind the fence gate. A concreate walkway should also extend from the driveway to the pad and from the pad to the side door to the garage.

The minimum rear setbacks and the maximum height of the homes would remain the same and the standards in the zoning ordinance. On Page 20 of this report is a table that shows each home plan and their actual front, side, and rear setbacks if the home was placed as close to the street as allowed by the Staff recommendation, maximizing the rear yard area. The table shows that only three of the nine home plans will actually be less than 18 feet back from the front property line (18 feet is Lemoore's typical standard.)



Applicant-proposed Building Setbacks

Comparison of Existing and Proposed Minimum Building Setbacks

	Required by Zoning Ordinance	Applicant-proposed Setbacks for this PUD	Staff Recommendation for this PUD
Front to Living Space (minimum)	18 feet with 2-foot stagger from adjacent homes 12 feet to covered porch	12 feet to one-story Exception – 10 feet for Plan 7512 15 feet to two-story	12 feet to one-story Exception - See note 12 feet to covered porch 15 feet to two-story
Front to Garage (minimum)	20 feet	20 feet	20 feet
Interior Side (minimum)	5 feet for one-story 10 feet for two-story	5 feet (all)	5 feet (all)
Street Side (minimum)	15 feet	10 feet	10 feet
Rear (minimum)	10 feet for one-story 15 feet for two-story	10 feet for one-story 15 feet for two-story	10 feet for one-story 15 feet for two-story
Height (maximum)	35 feet	35 feet	35 feet
Note – Staff Recommendation would be that Plan 7512 (Olive) may have a 10-foot minimum front setback to living space on lots less than 84 feet deep. Plan 7512 (Olive) shall not be allowed to be constructed on corner lots less than 84 feet deep.			

Calculated Setbacks per House Type Resulting from Staff Recommended Standards

House Plan Name	No. of Stories	Front Setback to Garage	Front Setback to Living Space (or porch)	Side Setback	Street Side Setback	Rear Setback
Clementine Home Series on 50’ x 80’ Lots						
The Plum	1	23’	12’	5’	10’	10’ 4’’
The Olive – Lots less than 84’ deep (see Note)	1	20’ 4’’	10’	5’	10’	10’
The Olive – Lots 84’ deep or more	1	22’ 4’’	12’	5’	10’	12’
The Dewberry	2	20’	20’ to porch	5’	10’	20’ 8’’
The Persimmon	2	22’	12’ to porch	5’	10’	17’ 2’’
Note: The Olive Plan is not allowed on corner lots less than 84’ deep						
Coronet Home Series on 50’ x 100’ Lots						
The Aria	1	20’	18’	5’	10’	22’
The Cadence	1	20’	27’	5’	10’	17’
The Harmony	2	20’	25’ to porch	5’	10’	32’
The Overture	2	21’	12’ to porch	5’	10’	28’
The Rhapsody	2	20’	18’	5’	10’	22’

Note: These dimensions maximize the rear yard area. Some homes could be set farther back and still meet all the minimum standards.

Residential Master Home Plans:

Review of residential master home plans is part of the Major Site Plan Review process for new residential subdivisions. The architecture of the home plans is depicted in the attached floor plan and elevation plans. Nine floor plans were submitted with square footages of between 1,460 and 3,240 square feet. Four of the homes are single-story and five are two-story.

One plan has two bedrooms, three plans have three bedrooms, two plans have four bedrooms, and three plans have five bedrooms. Four of the nine plans have three possible front facades, with five having two possible facades, resulting in 22 possible front facades in the neighborhood. The types of facades are differentiated by front façade detailing. However, the differentiations are slight, and the homes do have a roughly similar look.

Staff reviewed the home master plans and elevations for conformance with Lemoore's Zoning Ordinance Section 9-5C-3 (Design Standards for Residential Projects.) In all, 22 different front elevation "looks" would be available to meet the City's "six pack" rule.

To meet the standards for home plans in the Zoning Ordinance, a condition has been recommended that the detailing placed on the front of the house be wrapped around to the side of the house and on the street side of corner lots and that all homes shall be oriented to the street with garages deemphasized and living areas placed toward the front of homes. All other requirements for new master plan home designs are being met, including the requirement that all home plans provide entry features from a public or common sidewalk.

Utilities and Development Impact Fees

All wet and dry utilities will be installed by the developer. The project can hook into a sewer trunk line in Pedersen Street and a water line in Bush Street. Both were installed when the college was constructed and were sized to also serve future development such as the proposed project. Development impact fees will be paid when the homes acquire their certification of occupancy just prior to move-in.

Environmental Assessment:

An Initial Study/Mitigated Negative Declaration (IS/MND) was prepared for the project in accordance with the California Environmental Quality Act (CEQA), along with technical evaluations of air quality, biological resources, cultural resources, and traffic impact. Mitigation measures were included for potential impacts to biology, tribal cultural resources, geology & soils, and traffic. The full list of mitigation measures can be found on pages 2 through 7 of the Mitigated Negative Declaration (MND).

Prior to the preparation of this staff report, two comment letters were received on the MND; one from the Department of Toxic Substances Control (DTSC) and the other from PG&E. Upon review of the letters, City staff believes the comments are either not applicable to the project or will be dealt with through the typical requirements on construction. The letters are attached.

Recommended Findings:

Staff recommends that the following findings be included in the Commission's recommendation for approval. These findings are required by the Zoning Ordinance to be made to approve the project.

1. The General Plan Amendment is in the public interest, and the General Plan, as amended, will remain internally consistent. The land use designation changes result in no net gain or loss in residential density and comply with State law prohibiting general plan changes to a less intensive use or reducing intensity of land use.
2. The project implements a goal of the General Plan to develop residential uses around West Hills College.
3. The Zoning Map Amendment of the map is consistent with the General Plan goals, policies, and implementation programs.
4. The Planned Unit Development (PUD) is compatible and in conformity with public convenience, general welfare, and good land use and zoning practice. The PUD provides for alternative development standards that will increase the density of the site while avoiding negative impacts.
5. The PUD will not be detrimental to the health, safety, and general welfare of the City.
6. The PUD will not adversely affect the orderly development of property or the preservation of property values as the project involves the development of well-designed single-family homes.
7. The Tentative Subdivision Map is consistent with the General Plan and all applicable provisions of the Zoning Code as modified by the PUD.
8. The proposed project will not be substantially detrimental to adjacent property and will not materially impair the purposes of the Zoning Ordinance or the public interest.
9. As proposed and conditioned herein, the site design of the project is consistent with the new residential development standards in the Zoning Ordinance, as modified by the PUD.
10. The proposed project is consistent with the objectives of the General Plan and complies with applicable zoning regulations, including the proposed overlay zone for the PUD, specific plan provisions, and improvement standards adopted by the City.
11. The proposed architecture, site design, and landscape are suitable for the purposes of the building and the site and will enhance the character of the neighborhood and community.
12. The architecture, character, and scale of the buildings and the site are compatible with the character of buildings on adjoining and nearby properties.
13. The proposed project will not create conflicts with vehicular, bicycle, or pedestrian transportation modes of circulation.

14. The project's lot sizes are consistent with densities in the General Plan and are appropriate for this site.

15. The General Plan Amendment shall include that all references to the College Drive in the General Plan shall be changed to College Avenue.

Recommended Conditions

Staff recommends that the following conditions be placed on the Planned Unit Development 2020-01 and Tentative Subdivision Map Tract 848.

1. The site shall be developed consistent with the approved Tentative Subdivision Map, as modified by the Planned Unit Development, these conditions, and applicable development standards found in the Zoning Ordinance and Lemoore Municipal Code.

2. The site shall be developed consistent with this report and with the Major Site Plan Review comments dated April 17, 2020.

3. The project shall be developed and maintained in substantial compliance with the Tentative Subdivision Map Tract 848, except for any modifications that may be needed to meet these conditions of approval.

4. The final subdivision map shall be submitted in accordance with City ordinances and standards. The gas pipeline corridor shall be designated a non-numbered lot and dedicated to the City. The area shown as "future development" shall be designated a remainder parcel.

5. The developer shall incorporate the mitigation measures, as identified in the Mitigated Negative Declaration, into the project.

6. Plans for all public and private improvements, including but not limited to, water, sewer, storm drainage, road pavement, curb and gutter, sidewalk, street lights, landscaping, and fire hydrants shall be approved by the City Engineer, and these improvements shall be completed in accordance with the approved plans to the satisfaction of the Public Works Director.

7. On-site and off-site traffic and street improvements shall be constructed per these conditions, the Major Site Plan Review 2020-01 comments, and the mitigation measures in the Mitigated Negative Declaration.

8. Perimeter arterial roadways shall be constructed and widened per City standards and the cross-sections on the Tentative Subdivision Map as follows:

    - In Phase 1, Bush Street from Semas Drive to the most westerly gas pipeline easement, Semas Drive between Bush Street and the south side of Harvard Drive, and College Avenue between the south side of Boston Way and most northerly gas pipeline easement.

- In Phase 2, College Avenue from Boston Way to Pedersen Street, Pedersen Street from College Avenue to the east side of Lot 219.

- In Phase 3, Pedersen Street from the east side of Lot 219 to Semas Drive, Semas Drive from the south side of Harvard Drive to Pedersen Street.

9. Ponding basin and storm drainage improvements shall be constructed per the Major Site Plan Review No. 2020-01 comments.

10. A landscaped trail between the existing gas pipeline easements in the northwest area of the project site from Bush Street to College Avenue shall be constructed prior to the final inspection of the 5th new home constructed in Phase 2, with a trail connection to the Yale Circle cul-de-sac between Lots 176 and 177 and a sidewalk or trail connection from the trail to Boston Way along College Avenue. The acreage of the landscaped area may be counted toward park land dedication requirements in Section 8-7N-4 of the City Municipal Code. The landscaping and amenities will include, but not be limited to, trees, shrubbery, grass, waste containers at each end of the trail, solar-powered lighting at 120-foot intervals, and three benches. Signage at the trail ends at Bush Street and College Avenue shall be required. Landscaping, amenities and signage to be approved by the Community Development Director prior to installation.

11. The park south of West Hills Way shall be constructed and opened to the public for use, including playground amenities, prior to completion of the 5th home in Phase 1 (not including model homes).

12. Park land in-lieu fees shall be paid to the City for 5.79 acres minus the acres provided for the park and landscaped trail on the improvement plans, in accordance with the procedures in Section 8-7N-4 of the City Municipal Code. Fees shall be paid prior to approval of the Final Map.

13. A public facilities maintenance district (PFMD) shall be formed in conjunction with the Final Map acceptance in order to provide the maintenance costs for the park, landscape trail, common landscaping, street maintenance, and other improvements in accordance with existing City policy.

14. The project shall be subject to the applicable development impact fees adopted by resolution of the City Council.

15. In conjunction with approval of the Final Map, a noise and odor easement shall be recorded on all lots created, in a form acceptable to the City Attorney, to acknowledge the presence of nearby industry, railroad, and freeways, and the right of the such uses to continue to emit such noise and odors as are otherwise allowable by law and to ensure that such uses in these areas are not unreasonably hindered by residential users and owners that move in or nearby at a later date.

16. In conjunction with approval of the Final Map, an easement shall be recorded on all lots created identifying that the property is near a military installation subject to high aircraft noise, low level aircraft, aircraft tests, and/or other military related issues.

17. New residences shall be constructed so as to attain an indoor noise level of 45 decibels (45 dB CNEL), in accordance with noise attenuation standards of the City adopted building code.

18. The developer shall comply with the standards, provisions, and requirements of the San Joaquin Valley Air Pollution Control District that relate to the project.

19. A minimum six-foot eight-inch (6’ 8”) high block wall with decorative columns and caps at least every 100 feet shall be constructed per City standards adjacent to College Avenue, Pedersen Street, Semas Drive, and Bush Street adjacent to Lots 155 and 156. Landscaping shall be added to cover at least 50% of the wall within five years of installation.

20. A wrought iron fence (or equivalent material acceptable to the Community Development Director) shall be constructed to City standards along the west property lines of lots 157 to 177 to separate the subdivision from the trail.

21. Fire hydrant and connection types and locations shall be approved by the Lemoore Volunteer Fire Department.

22. Concrete pads for installation of mailboxes shall be provided in accordance with determinations made by the Lemoore Postmaster.

23. Street trees from the City approved street tree list shall be planted with root barriers as per Public Works Standards and Specifications.

24. Streetlights shall be provided within the project as per City local streetlight standards.

25. One or more Kings Area Rural Transit (KART) bus stops shall be constructed, if required, at locations directed by KART.

26. The sidewalk type along local streets (parkway type or curb adjacent type) shall be consistent throughout all phases of the subdivision, as per City standards.

27. The sidewalk type along arterial and collector streets shall be parkway type and consistent with City standards.

28. Any existing roadway, sidewalk, or curb and gutter that is damaged during construction shall be repaired or replaced to the satisfaction of the Public Works Director.

29. Subdivision entrance signage is required at the Harvard Drive entrance. Subdivision entrance signage shall be allowed at other entrances. All signs shall require a sign permit separate from the building permit.

30. Lot sizes less than 7,000 square feet, consistent with the sizes shown on the Tentative Subdivision Map Tract 848, shall be adopted per the PUD established by the City Council.

31. The building setbacks shall be per the adopted PUD established by the City Council. The minimum building setbacks recommended to the Council are as follows:

Required Setbacks	PUD No. 2020-01
Front to Living Space (minimum)	12 feet to one-story - See note 12 feet to covered porch 15 feet to two-story
Front to Garage (minimum)	20 feet
Interior Side (minimum)	5 feet
Street Side (minimum)	10 feet
Rear (minimum)	10 feet for one-story 15 feet for two-story
Height (maximum)	35 feet
Note – Plan 7512 (Olive) may have a 10-foot minimum front setback to living space on lots less than 84 feet deep. Plan 7512 (Olive) shall not be constructed on corner lots less than 84 feet deep.	

32. Master home plans shall be substantially consistent to the floor plans and elevations submitted with the Tentative Subdivision Map Tract 848, unless subsequently modified by the Planning Commission. Detailing used on the front of the home shall be carried around (or wrapped around) to the street side of the home where the side of the home is visible from the public street, such as in front of the fence.

33. A concrete pad shall be built behind the fence gate of each home, with a minimum dimension of 4’ by 12’, to store refuse containers from public view. A walkway shall be constructed from the driveway to the concrete pad, and from the concrete pad to the side door entrance to the garage.

34. The project and all subsequent uses must meet the requirements found in Section 9-5B-2 of the Zoning Ordinance related to noise, odor, and vibration, and maintenance.

35. The Tentative Subdivision Map Tract 848 approval shall expire two years from the date of City Council approval, unless a Final Map is filed or an extension is granted via legislation or by the City, in accordance with the Subdivision Map Act. Expiration dates for the Major Site Plan Review 2020-01 and Planned Unit Development 2020-01 shall run consistent with the expiration date of the Tentative Subdivision Map.

Attachments:

Resolution No. 2020-05
Tentative Subdivision Map Tract No. 848
Typical Setbacks for 50’x80’ lots
Typical Setbacks for 50’x100’ lots
Building Elevations and Floor Plans – 9 sets
Major Site Plan Review No. 2020-01 Comments dated April 17, 2020
Mitigated Negative Declaration dated April 2020
Initial Response Letters Received – 2 letters

RESOLUTION NO. 2020-05

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF LEMOORE APPROVING GENERAL PLAN AMENDMENT NO. 2020-02, ZONING MAP AMENDMENT NO. 2020-02, PLANNED UNIT DEVELOPMENT NO. 2020-01, TENTATIVE SUBDIVISION MAP TRACT 848, AND MAJOR SITE PLAN REVIEW NO. 2020-01 TO DIVIDE 54.1 ACRES INTO 362 SINGLE-FAMILY LOTS AND A PARK AND FOR APPROVAL OF NEW SINGLE-FAMILY HOME MASTER PLANS, LOCATED SOUTH OF BUSH STREET AND EAST OF COLLEGE AVENUE, IN THE CITY OF LEMOORE

At a Regular Meeting of the Planning Commission of the City of Lemoore (City) duly called and held on May 11, 2020, at 7:00 p.m. on said day, it was moved by Commissioner ______________, seconded by Commissioner ______________, and carried that the following Resolution be adopted:

WHEREAS, Lennar Homes has requested approval of a General Plan Amendment, Zoning Map Amendment, Planned Unit Development, Tentative Subdivision Map, and a Major Site Plan Review to divide 54.1 acres into 362 single-family lots and a park, and for approval of new single-family home master plans, located south of Bush Street and east of College Avenue, in the City of Lemoore (APNs: 023-510-040 & 023-480-031); and

WHEREAS, the proposed site is 54.1 acres in size and is zoned Low Density Residential, Low-Medium Density Residential, Mixed Use, and Parks/Recreation; and

WHEREAS, an Initial Study was prepared in conformance with the California Environmental Quality Act (CEQA) Guidelines, and it was found that the proposed project could not have a significant effect on the environment, with mitigations. Therefore, a Mitigated Negative Declaration has been prepared for this project; and

WHEREAS, the Lemoore Planning Commission held a duly noticed public hearing at its May 11, 2020 meeting.

NOW THEREFORE, BE IT RESOLVED that the Planning Commission of the City of Lemoore hereby makes the following findings regarding the proposed projects, based on facts detailed in the May 7, 2020, staff report, which is hereby incorporated by reference, as well as the evidence and comments presented during the Public Hearing:

1. The General Plan Amendment is in the public interest, and the General Plan, as amended, will remain internally consistent. The land use designation changes result in no net gain or loss in residential density and comply with State law prohibiting general plan changes to a less intensive use or reducing intensity of land use. The shorter setbacks allow for an increased number of residential units overall in the project area.
2. The project implements a goal of the General Plan to develop residential uses around West Hills College.
3. The Zoning Map Amendment of the map is consistent with the General Plan goals, policies, and implementation programs.
4. The Planned Unit Development (PUD) is compatible and in conformity with public convenience, general welfare, and good land use and zoning practice. The PUD provides for alternative development standards that will increase the density of the site while avoiding negative impacts.

5. The PUD will not be detrimental to the health, safety, and general welfare of the City.
6. The PUD will not adversely affect the orderly development of property or the preservation of property values as the project involves the development of well-designed single-family homes.
7. The Tentative Subdivision Map is consistent with the General Plan and all applicable provisions of the Zoning Code as modified by the PUD.
8. The proposed project will not be substantially detrimental to adjacent property and will not materially impair the purposes of the Zoning Ordinance or the public interest.
9. As proposed and conditioned herein, the site design of the project is consistent with the new residential development standards in the Zoning Ordinance, as modified by the PUD.
10. The proposed project is consistent with the objectives of the General Plan and complies with applicable zoning regulations, including the proposed overlay zone for the PUD, specific plan provisions, and improvement standards adopted by the City.
11. The proposed architecture, site design, and landscape are suitable for the purposes of the building and the site and will enhance the character of the neighborhood and community.
12. The architecture, character, and scale of the building and the site are compatible with the character of buildings on adjoining and nearby properties.
13. The proposed project will not create conflicts with vehicular, bicycle, or pedestrian transportation modes of circulation.
14. The project's lot sizes are consistent with densities in the General Plan and are appropriate for this site.

15. The General Plan Amendment shall include that all references to the College Drive in the General Plan shall be changed to College Avenue.

BE IT FURTHER RESOLVED that the Planning Commission of the City of Lemoore recommends approval of the Mitigated Negative Declaration, General Plan Amendment No. 2020-02, Zoning Map Amendment No. 2020-02, Planned Unit Development No. 2020-01, Tentative Subdivision Map Tract 848, and Major Site Plan Review No. 2020-01, subject to the following conditions:

1. The site shall be developed consistent with the approved Tentative Subdivision Map Tract 848, as modified by the Planned Unit Development No. 2020-01, these conditions, and applicable development standards found in the Zoning Ordinance and Lemoore Municipal Code.

2. The site shall be developed consistent with this report and with the Major Site Plan Review No. 2020-01 comments dated April 17, 2020.

3. The project shall be developed and maintained in substantial compliance with the Tentative Subdivision Map, except for any modifications that may be needed to meet these conditions of approval.

4. The final subdivision map shall be submitted in accordance with City ordinances and standards. The gas pipeline corridor shall be designated a non-numbered lot and dedicated to the City. The area shown as “future development” shall be designated a remainder parcel.

5. The developer shall incorporate the mitigation measures, as identified in the Mitigated Negative Declaration dated April 2020, into the project.

6. Plans for all public and private improvements, including but not limited to, water, sewer, storm drainage, road pavement, curb and gutter, sidewalk, street lights, landscaping, and fire hydrants shall be approved by the City Engineer, and these improvements shall be completed in accordance with the approved plans to the satisfaction of the Public Works Director.

7. On-site and off-site traffic and street improvements shall be constructed per these conditions, the Major Site Plan Review 2020-01 comments, and the mitigation measures in the Mitigated Negative Declaration.

8. Perimeter arterial roadways shall be constructed and widened per City standards and the cross-sections on the Tentative Subdivision Map Tract 848 as follows:

    - In Phase 1, Bush Street from Semas Drive to the most westerly gas pipeline easement, Semas Drive between Bush Street and the south side of Harvard Drive, and College Avenue between the south side of Boston Way and most northerly gas pipeline easement.

    - In Phase 2, College Avenue from Boston Way to Pedersen Street, Pedersen Street from College Avenue to the east side of Lot 219.

    - In Phase 3, Pedersen Street from the east side of Lot 219 to Semas Drive, Semas Drive from the south side of Harvard Drive to Pedersen Street.

9. Ponding basin and storm drainage improvements shall be constructed per the Major Site Plan Review No. 2020-01 comments.

10. A landscaped trail between the existing gas pipeline easements in the northwest area of the project site from Bush Street to College Avenue shall be constructed prior to the final inspection of the 5th new home constructed in Phase 2, with a trail connection to the Yale Circle cul-de-sac between Lots 176 and 177 and a sidewalk or trail connection from the trail to Boston Way along College Avenue. The acreage of the landscaped area may be counted toward park land dedication requirements in Section 8-7N-4 of the City Municipal Code. The landscaping and amenities will include, but not be limited to, trees, shrubbery, grass, waste containers at each end of the trail, solar-powered lighting at 120-foot intervals, and three benches. Signage at the trail ends at Bush Street and College Avenue shall be required. Landscaping, amenities and signage to be approved by the Community Development Director prior to installation.

11. The park south of West Hills Way shall be constructed and opened to the public for use, including playground amenities, prior to completion of the 5th home in Phase 1 (not including model homes).

12. Park land in-lieu fees shall be paid to the City for 5.79 acres minus the acres provided for the park and landscaped trail on the improvement plans, in accordance with the

procedures in Section 8-7N-4 of the City Municipal Code. Fees shall be paid prior to approval of the Final Map.

13. A public facilities maintenance district (PFMD) shall be formed in conjunction with the Final Map acceptance in order to provide the maintenance costs for the park, landscape trail, common landscaping, street maintenance, and other improvements in accordance with existing City policy.

14. The project shall be subject to the applicable development impact fees adopted by resolution of the City Council.

15. In conjunction with approval of the Final Map, a noise and odor easement shall be recorded on all lots created, in a form acceptable to the City Attorney, to acknowledge the presence of nearby industry, railroad, and freeways, and the right of the such uses to continue to emit such noise and odors as are otherwise allowable by law and to ensure that such uses in these areas are not unreasonably hindered by residential users and owners that move in or nearby at a later date.

16. In conjunction with approval of the Final Map, an easement shall be recorded on all lots created identifying that the property is near a military installation subject to high aircraft noise, low level aircraft, aircraft tests, and/or other military related issues.

17. New residences shall be constructed so as to attain an indoor noise level of 45 decibels (45 dB CNEL), in accordance with noise attenuation standards of the City adopted building code.

18. The developer shall comply with the standards, provisions, and requirements of the San Joaquin Valley Air Pollution Control District that relate to the project.

19. A minimum six-foot eight-inch (6’ 8”) high block wall with decorative columns and caps at least every 100 feet shall be constructed per City standards adjacent to College Avenue, Pedersen Street, Semas Drive, and Bush Street adjacent to Lots 155 and 156. Landscaping shall be added to cover at least 50% of the wall within five years of installation.

20. A wrought iron fence (or equivalent material acceptable to the Community Development Director) shall be constructed to City standards along the west property lines of lots 157 to 177 to separate the subdivision from the trail.

21. Fire hydrant and connection types and locations shall be approved by the Lemoore Volunteer Fire Department.

22. Concrete pads for installation of mailboxes shall be provided in accordance with determinations made by the Lemoore Postmaster.

23. Street trees from the City approved street tree list shall be planted with root barriers as per Public Works Standards and Specifications.

24. Streetlights shall be provided within the project as per City local streetlight standards.

25. One or more Kings Area Rural Transit (KART) bus stops shall be constructed, if required, at locations directed by KART.

26. The sidewalk type along local streets (parkway type or curb adjacent type) shall be consistent throughout all phases of the subdivision, as per City standards.

27. The sidewalk type along arterial and collector streets shall be parkway type and consistent with City standards.

28. Any existing roadway, sidewalk, or curb and gutter that is damaged during construction shall be repaired or replaced to the satisfaction of the Public Works Director.

29. Subdivision entrance signage is required at the Harvard Drive entrance. Subdivision entrance signage shall be allowed at other entrances. All signs shall require a sign permit separate from the building permit.

30. Lot sizes less than 7,000 square feet, consistent with the sizes shown on the Tentative Subdivision Map Tract 848, shall be adopted per the PUD established by the City Council.

31. The building setbacks shall be per the adopted PUD established by the City Council. The minimum building setbacks recommended to the Council are as follows:

Required Setbacks	**PUD No. 2020-01**
Front to Living Space (minimum)	12 feet to one-story - See note 12 feet to covered porch 15 feet to two-story
Front to Garage (minimum)	20 feet
Interior Side (minimum)	5 feet
Street Side (minimum)	10 feet
Rear (minimum)	10 feet for one-story 15 feet for two-story
Height (maximum)	35 feet
Note – Plan 7512 (Olive) may have a 10-foot minimum front setback to living space on lots less than 84 feet deep. Plan 7512 (Olive) shall not be constructed on corner lots less than 84 feet deep.	

32. Master home plans shall be substantially consistent to the floor plans and elevations submitted with the Tentative Subdivision Map Tract 848, unless subsequently modified by the Planning Commission. Detailing used on the front of the home shall be carried around (or wrapped around) to the street side of the home where the side of the home is visible from the public street, such as in front of the fence.

33. A concrete pad shall be built behind the fence gate of each home, with a minimum dimension of 4’ by 12’, to store refuse containers from public view. A walkway shall be constructed from the driveway to the concrete pad, and from the concrete pad to the side door entrance to the garage.

34. The project and all subsequent uses must meet the requirements found in Section 9-5B-2 of the Zoning Ordinance related to noise, odor, and vibration, and maintenance.

35. The Tentative Subdivision Map Tract 848 approval shall expire two years from the date of City Council approval, unless a Final Map is filed or an extension is granted via legislation or by the City, in accordance with the Subdivision Map Act. Expiration dates for the Major Site Plan Review 2020-01 and Planned Unit Development 2020-01 shall run consistent with the expiration date of the Tentative Subdivision Map.

Passed and adopted at a Regular Meeting of the Planning Commission of the City of Lemoore held on May 11, 2020, by the following votes:

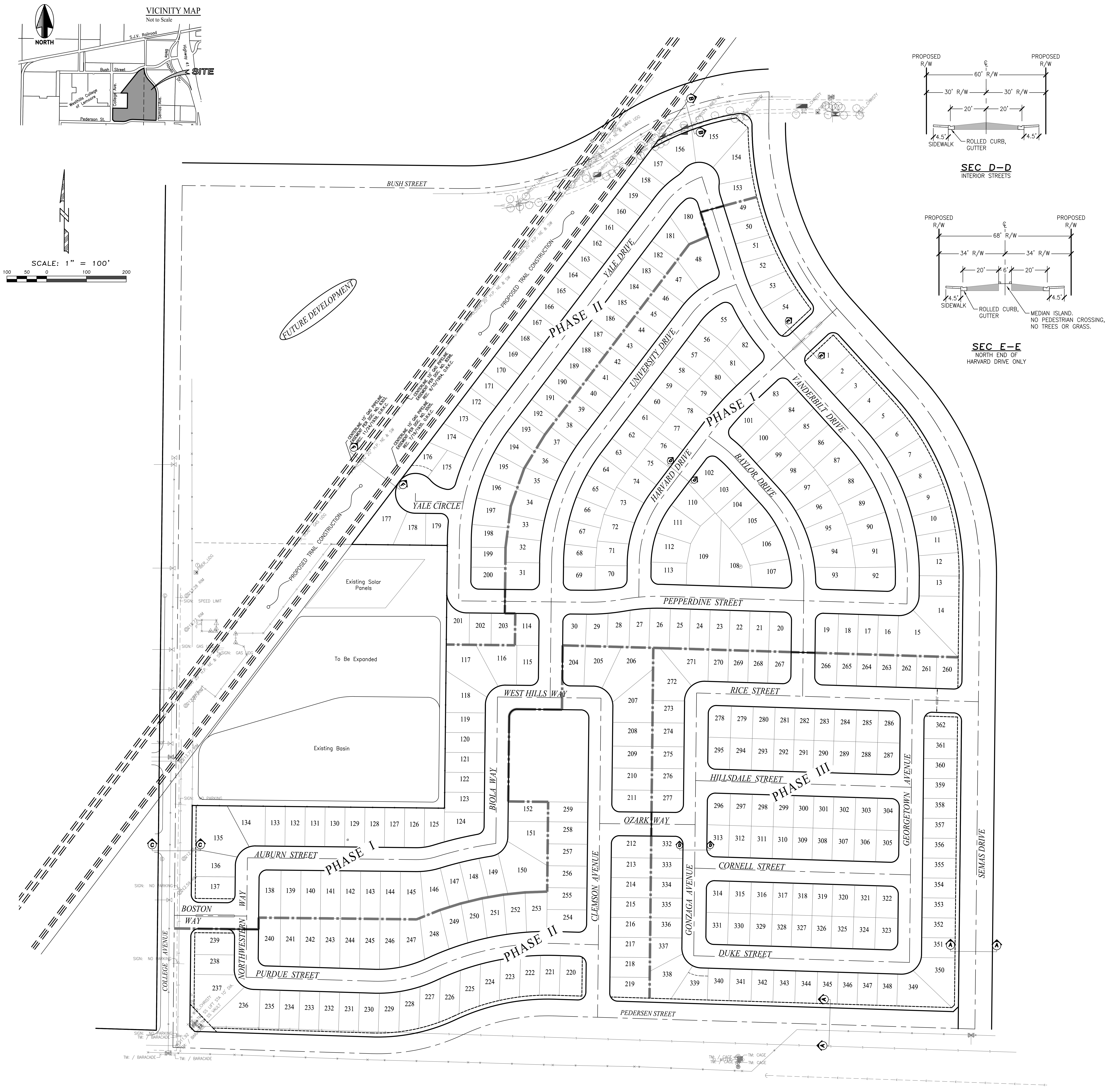
AYES:
NOES:
ABSTAINING:
ABSENT:

APPROVED:

____
Ray Etchegoin, Chairperson

ATTEST:

____
Kristie Baley, Commission Secretary



TENTATIVE SUBDIVISION MAP

LENNAR HOMES

COUNTY TRACT NO. 848

CITY OF LEMOORE, COUNTY OF KINGS, STATE OF CALIFORNIA

SEC D–D
INTERIOR STREETS

SEC E–E
NORTH END OF HARVARD DRIVE ONLY

LEGAL DESCRIPTION

PARCEL 10, AS SHOWN ON THAT CERTAIN PARCEL MAP FILED IN THE OFFICE OF THE RECORDER OF THE COUNTY OF KINGS, STATE OF CALIFORNIA ON JUNE 9, 2006 IN BOOK 18 OF MAPS PAGE 6.

OWNERS

PATRICK RICCHIUTI
8080 N. PALM AVE., SUITE 110
FRESNO, CA 93711

MINIMUM LOT SIZE:	4000 S.F. (MULTIPLE)
MAXIMUM LOT SIZE:	12315 S.F. (LOT 109)
AVERAGE LOT SIZE:	5138 S.F.
UNIT I AREA:	19.68 AC.
UNIT II AREA:	14.47 AC.
UNIT III AREA:	10.88 AC.
UNIT I INTERIOR STREET AREA:	8.34 AC.
UNIT II INTERIOR STREET AREA:	4.98 AC.
UNIT III INTERIOR STREET AREA:	4.99 AC.

APPLICANT

LENNAR HOMES OF CALIFORNIA INC.
8080 N. PALM AVE., SUITE 110
FRESNO, CA 93711

GENERAL INFORMATION

EXISTING ZONING	RLD & RLMD & MV
PROPOSED ZONING	SAME
EXISTING USE	VACANT
PROPOSED USE	RESIDENTIAL
SEWER	CITY OF LEMOORE
WATER	CITY OF LEMOORE
STORM DRAINAGE	LIFT STATION TO WETLANDS
A.P.N.	023-510-040 & 023-480-031
FLOOD ZONE	ZONE X PER FEMA FIRM 06031C0165D dated 09/16/2015

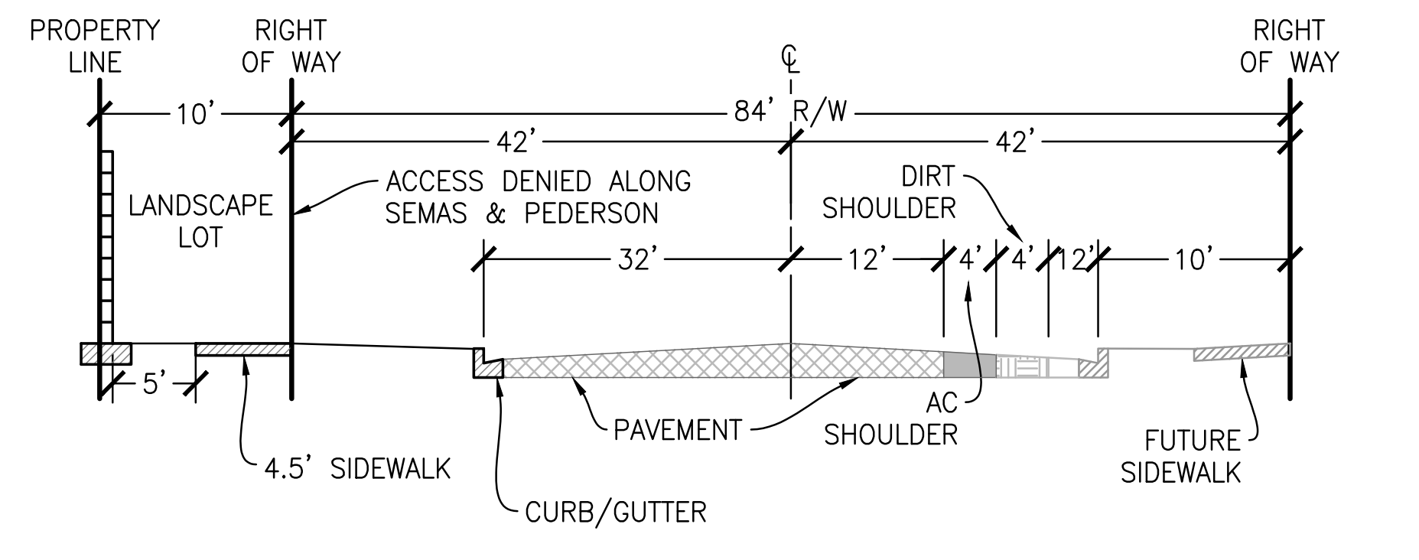
LOT INFORMATION	PHASE I	PHASE II	PHASE III	TOTAL
MINIMUM 50' X 80' LOTS:	60	51	103	214
MINIMUM 50' X 100' LOTS:	92	56	0	148
NUMBER OF LOTS:	152	107	103	362

LINEWORK LEGEND

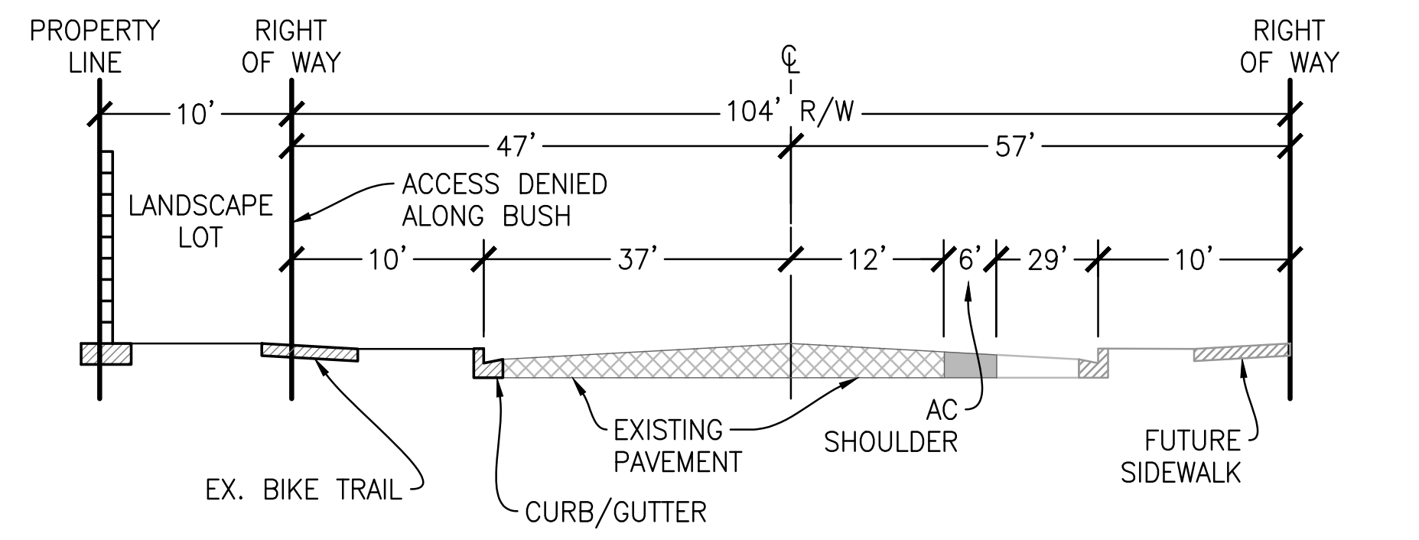
▬ ▪ ▬ ▪ ▬ PHASE LINE

TOPOGRAPHY LEGEND

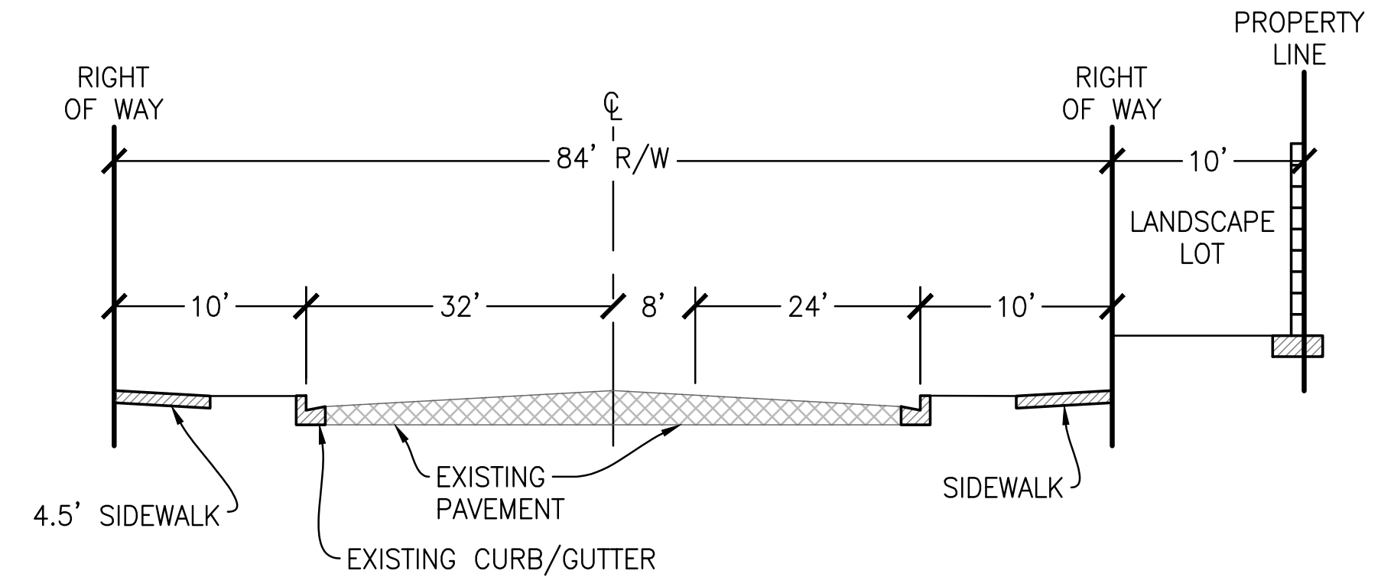
SEE PG. 2 OF 3



SEC A–A
SEMAS AVENUE & PEDERSEN STREET
(NORTH) (EAST)



SEC B–B
BUSH STREET
(LOOKING WEST)



SEC C–C
COLLEGE AVENUE

No.	Revisions	Date
1	City of Lemoore revisions	05/04/20

LENNAR HOMES OF CALIFORNIA
8080 N. PALM AVENUE, SUITE 110
FRESNO, CA 93711

REGISTERED PROFESSIONAL ENGINEER
ALEX T. DWIGGINS
61523
CIVIL
STATE OF CALIFORNIA

TENTATIVE SUBDIVISION MAP
FOR:
LENNAR HOMES OF CALIFORNIA INC.

CIVIL ENGINEERS
ZUMWALT
HANSEN INC.
LAND SURVEYORS
609 N. Irwin St.
Hanford, CA 93230
Office: (559) 582-1056
Fax: (559) 584-4143

DRAWN BY:	JB
CHECKED BY:	AD
INDEXED BY:	
DATE:	5/4/2020
JOB NO.:	0736412
SHEET:	1 OF 3

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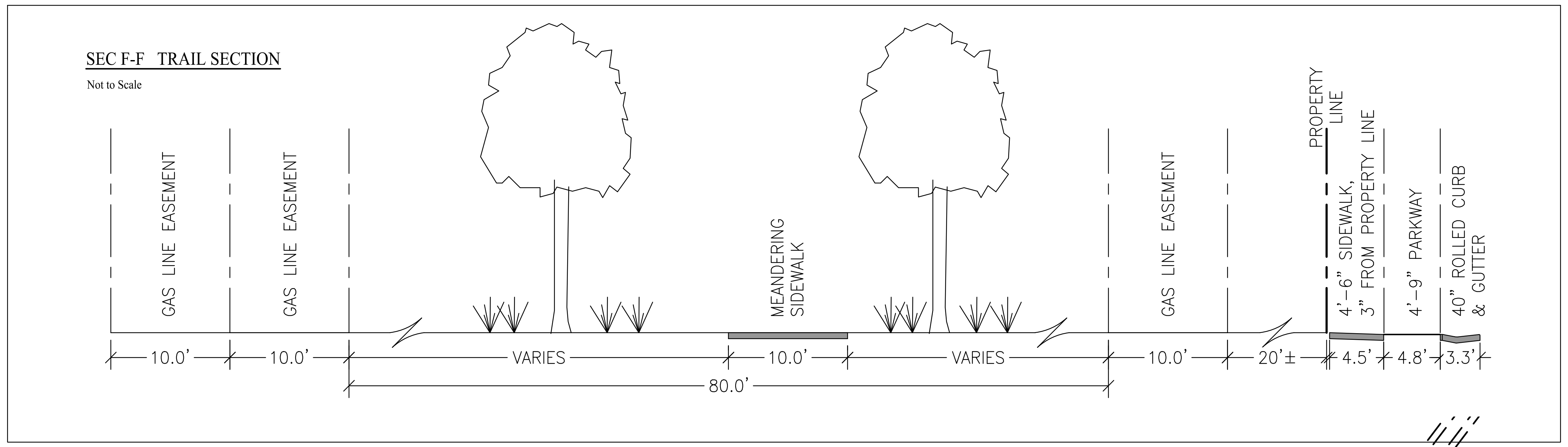

TOPO LEGEND

AC	ASPHALT PAVING
AAC	ASPHALT W/ASPHALT CURB
ACC	ASPHALT W/ASPHALT CURB
BW	BACK OF WALK
C	CONCRETE
CB	CATCH BASIN
CO	CLEANOUT
CR	ASPAHLT CROWN
DI	DROP INLET
DG	DIRT GRADE
DWY	DRIVEWAY
EP	EDGE OF PAVEMENT
EPB	ELECTRIC PANEL BOX
EV	ELECTRIC VAULT
FF	FINISHED FLOOR
FL	FLOW LINE
FO	FIBER OPTIC LINE
FTG	FOOTING
GDP	GUARD POST
GV	GAS VALVE
INV	INVERT
LS	LANDSCAPE
OG	ORIGINAL GROUND
PP	POWER POLE
P	PAD
SSCO	SANITARY SEWER CLEANOUT
SW	SWALE
TC	TOP OF CURB
TEMP.EL	TEMPORARY ELEVATION
TP	TELEPHONE POLE
TPB	TELEPHONE PANEL BOX
WBO	WATER BLOW-OFF
— CATV —	EXISTING CABLE TV LINE
— E —	EXISTING ELECTRIC LINE (UNDERGROUND)
- - E - -	EXISTING ELECTRIC LINE (OVERHEAD)
— FO —	EXISTING FIBER OPTIC LINE
— G —	EXISTING GAS LINE
— D —	EXISTING STORM DRAIN LINE
— S —	EXISTING SANITARY SEWER LINE
— T —	EXISTING TELEPHONE LINE (UNDERGROUND)
- - T - -	EXISTING TELEPHONE LINE (OVERHEAD)
— W —	EXISTING WATER LINE
— IRR —	EXISTING IRRIGATION LINE
—	EXISTING WOOD FENCE
— x —	EXISTING CHAINLINK FENCE
—	EXISTING POST & WIRE FENCE
▨	AC SURFACING
▨	CONCRETE SURFACE
▨	EXISTING AC SURFACING
▨	EXISTING CONCRETE SURFACE
⋈	BACKFLOW PREVENTOR
◐	BENCHMARK
◉	BORE
▫	CABLE TV CHRISTY BOX
○	DOMESTIC WELL
⊙⊙	DOUBLE CHECK VALVE

◊	DRIVEWAY
←	DOWN GUY
EC	ELECTRIC CHRISTY BOX
EM	ELECTRIC METER
EP	ELECTRIC PEDESTAL
Ⓔ	ELECTRIC SERVICE
☼	EXISTING STREET LIGHT
	FIRE HYDRANT
	FLAGPOLE
GM	GAS METER
Ⓖ	GAS SERVICE
⊘	GAS VALVE
△	GATE POST
●	GUARD POST
●—	GUY POLE
♿	HANDICAP PARKING
-⊖-	HOSEBIBB
Ⓦ	IRRIGATION AG WELL
Ⓟ	IRRIGATION STANDPIPE
Ⓥ	IRRIGATION VALVE
MB	MAILBOX
	MARKING PAINT
▪	TOPO
	PUMPER CONNECTION
	RAILROAD XING ARM
○RD	ROOF DRAIN
⊖	RUNWAY LIGHT
○	SANITARY SEWER CLEANOUT
◆	SANITARY SEWER LATERAL
Ⓢ	SANITARY SEWER MANHOLE
○	SIGN
◪	SPRINKLER CONTROL BOX
Ⓒ	S.D. CATCH BASIN MANHOLE
◉	STORM DRAIN INLET
Ⓓ	STORM DRAIN MANHOLE
◒	SERVICE POLE
T	TELEPHONE CHRISTY BOX
Ⓣ	TELEPHONE MANHOLE
▣	TELEPHONE PEDESTAL
	TRAFFIC CHRISTY
	TRAFFIC SIGNAL BOOM
	TRAFFIC SIGNAL POLE
	TRANSFORMER POLE
○	UTILITY POLE
▣	WATER METER
◎	WATER SERVICE
⋈	WATER VALVE
✡	WATER PIV

No.	Revisions	Date
1	City of Lemoore revisions	05/04/20

LENNAR HOMES OF CALIFORNIA
8080 N. PALM AVENUE, SUITE 110
FRESNO, CA 93711

FOR REVIEW ONLY
PRELIMINARY
REGISTERED PROFESSIONAL ENGINEER
ANDY T. DWIGGINS
CIVIL
STATE OF CALIFORNIA

TENTATIVE SUBDIVISION MAP
FOR:
LENNAR HOMES OF CALIFORNIA INC.

CIVIL ENGINEERS
ZUMWALT HANSEN INC.
LAND SURVEYORS
609 N. Irwin St.
Hanford, CA 93230
Office: (559) 582-1056
Fax: (559) 584-4143

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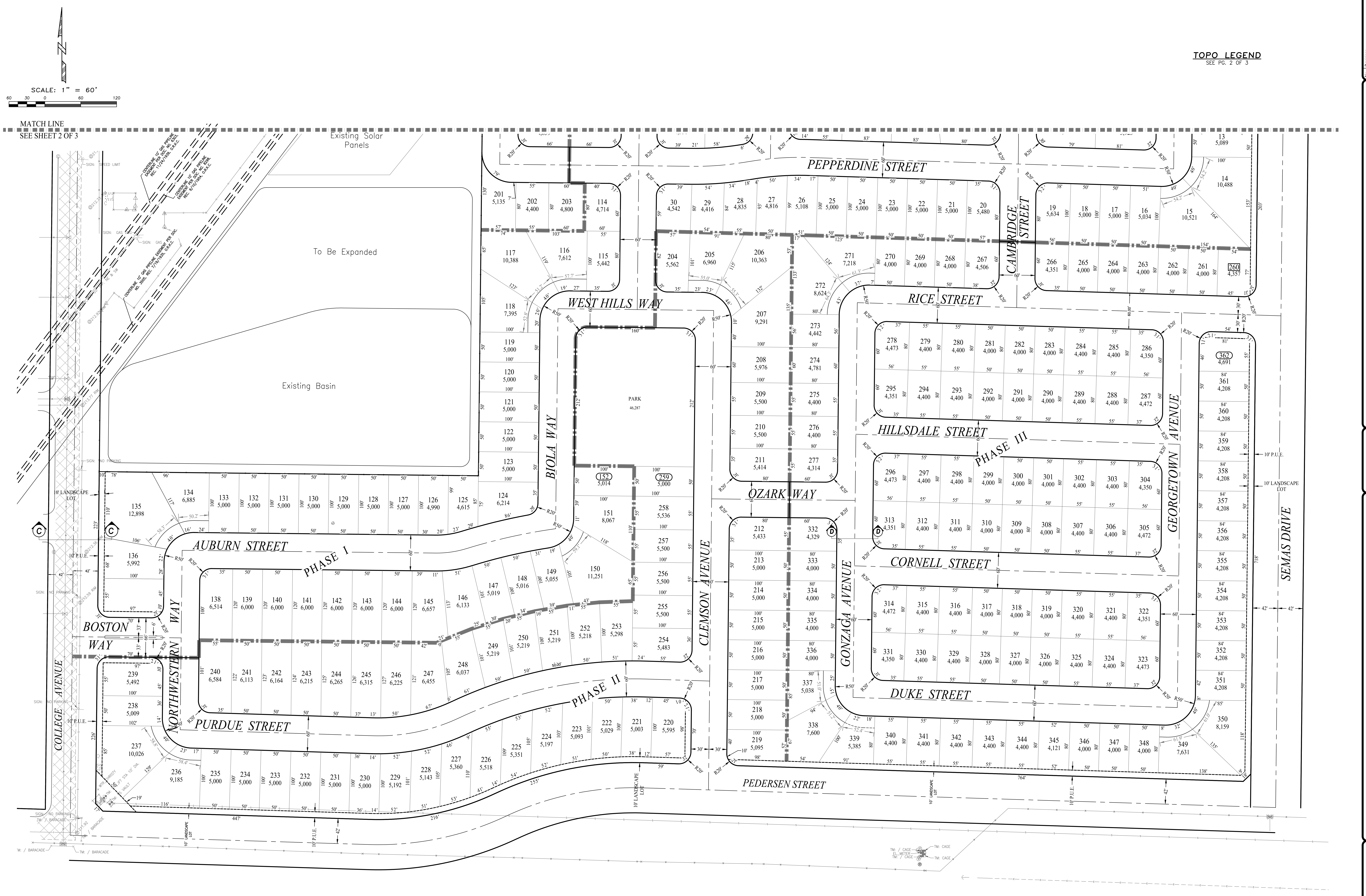

No.	Revisions	Date
1	City of Lemoore revisions	05/04/20

Lennar Homes of California
8080 N. Palm Avenue, Suite 110
Fresno, CA 93711

REGISTERED PROFESSIONAL ENGINEER
ALEX T. DWIGGINS
61523
CIVIL
STATE OF CALIFORNIA

Tentative Subdivision Map
for:
Lennar Homes of California Inc.

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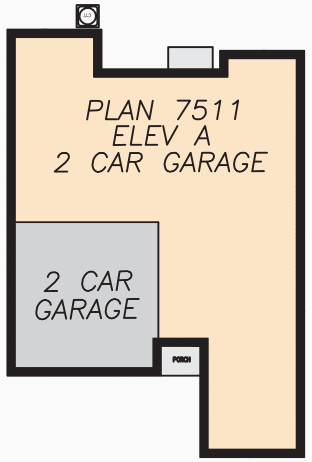
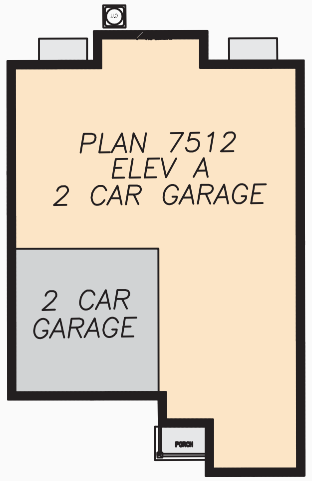
TENTATIVE TRACT NO. 848
TYPICAL SETBACKS
(ACTUAL FRONT AND REAR DIMENSIONS MAY VARY BY PLAN)

CLEMENTINE SERIES

THE PLUM
1,460 SQUARE FEET

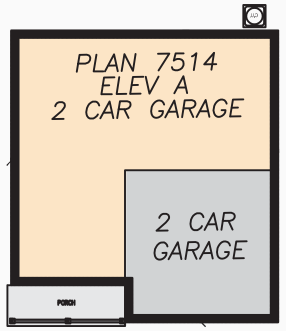


THE OLIVE
1,635 SQUARE FEET

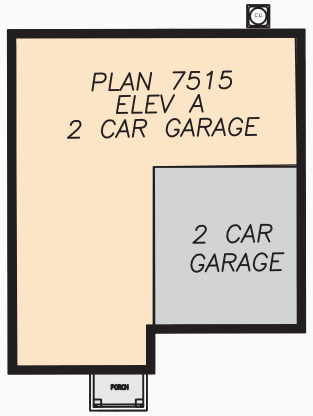


SINGLE STORY PLANS

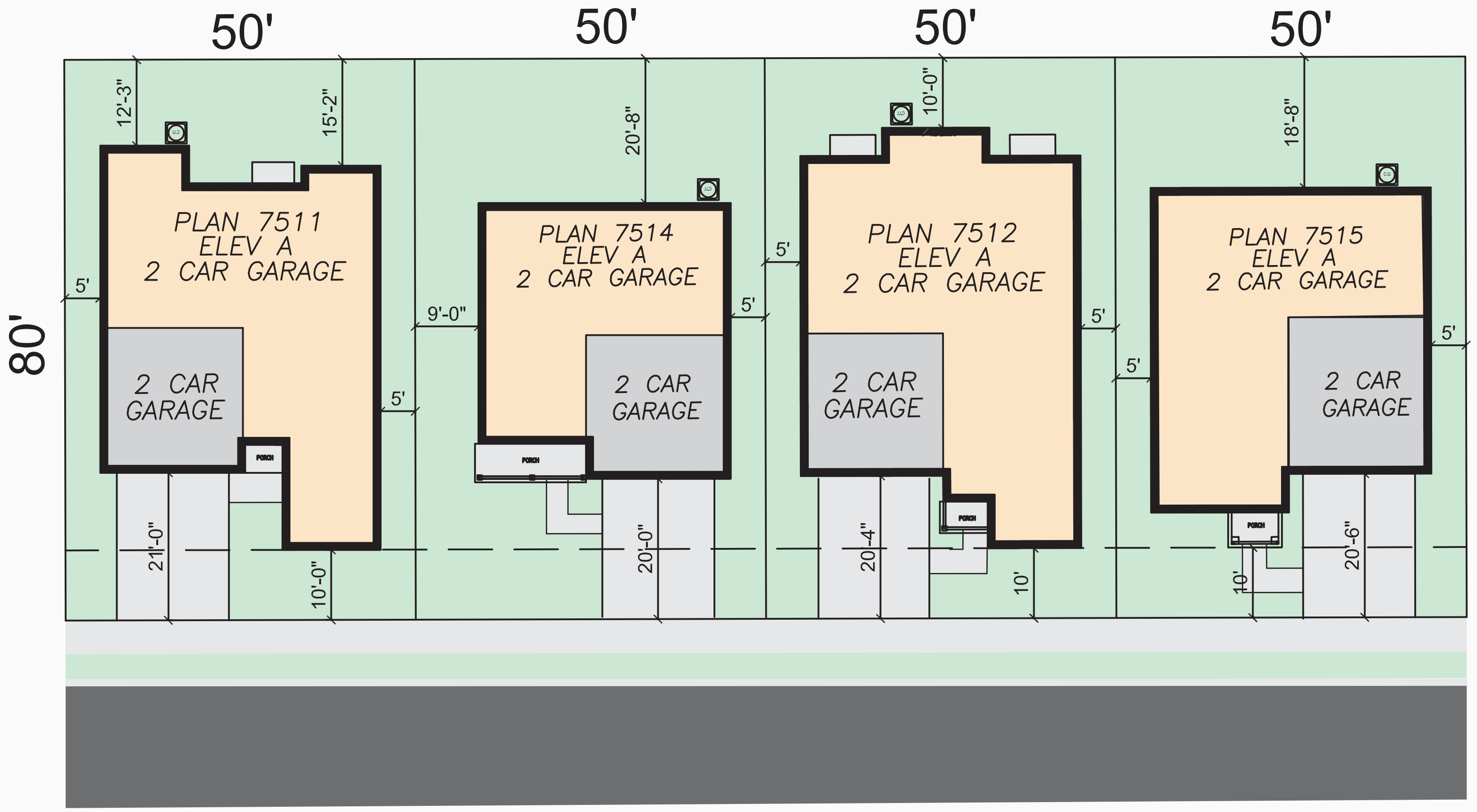
THE DEWBERRY
2,086 SQUARE FEET



THE PERSIMMON
2,985 SQUARE FEET



TWO STORY PLANS

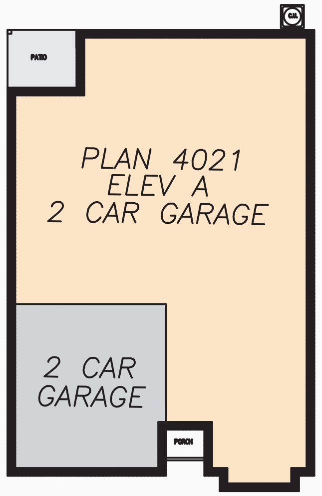


TENTATIVE TRACT NO. 848
TYPICAL SETBACKS

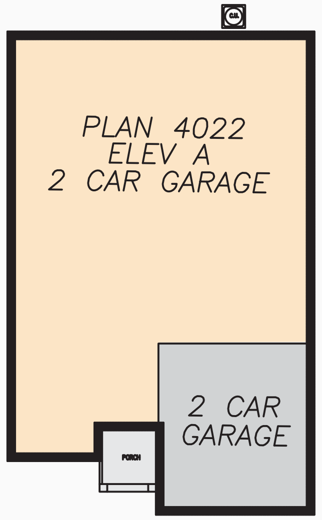
(ACTUAL FRONT AND REAR DIMENSIONS MAY VARY BY PLAN)

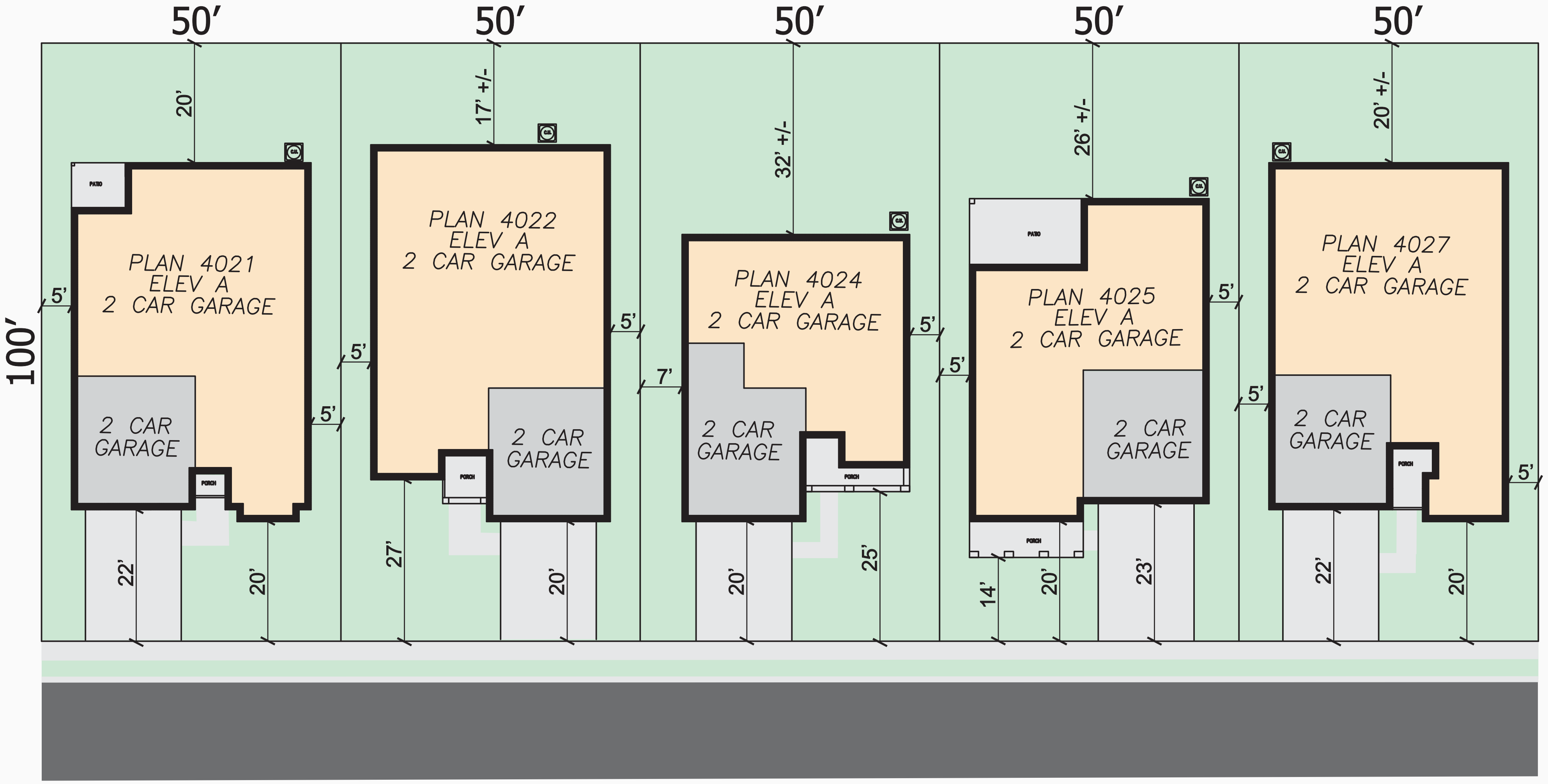
CORONET SERIES

THE ARIA
1,787 SQUARE FEET



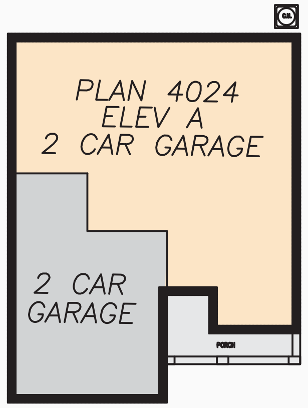
THE CADENCE
1,898 SQUARE FEET



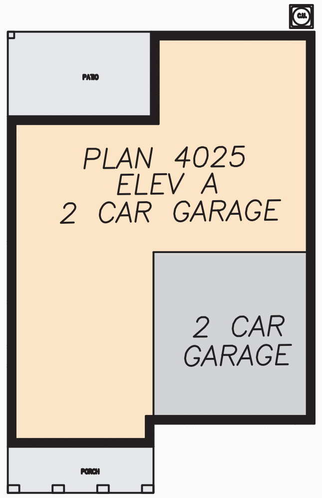


SINGLE STORY PLANS

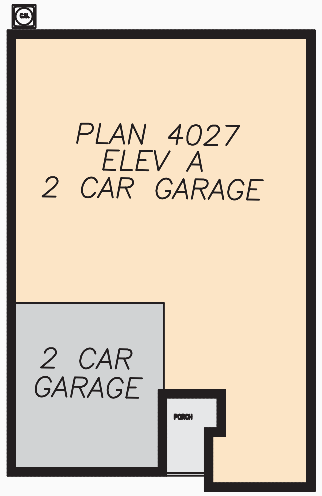
THE HARMONY
2,348 SQUARE FEET



THE OVERTURE
3,240 SQUARE FEET



THE RHAPSODY
3,128 SQUARE FEET



TWO STORY PLANS

The Plum, Plan 7511

1,460 SQUARE FEET

The Olive, Plan 7512

1,635 SQUARE FEET

The Dewberry, Plan 7514

2,086 SQUARE FEET

The Persimmon, Plan 7515

2,985 SQUARE FEET

The Aria Plan 4021

FIRST FLOOR

The Cadence Plan 4022

FLOOR PLAN

The Harmony, Plan 4024

FIRST FLOOR

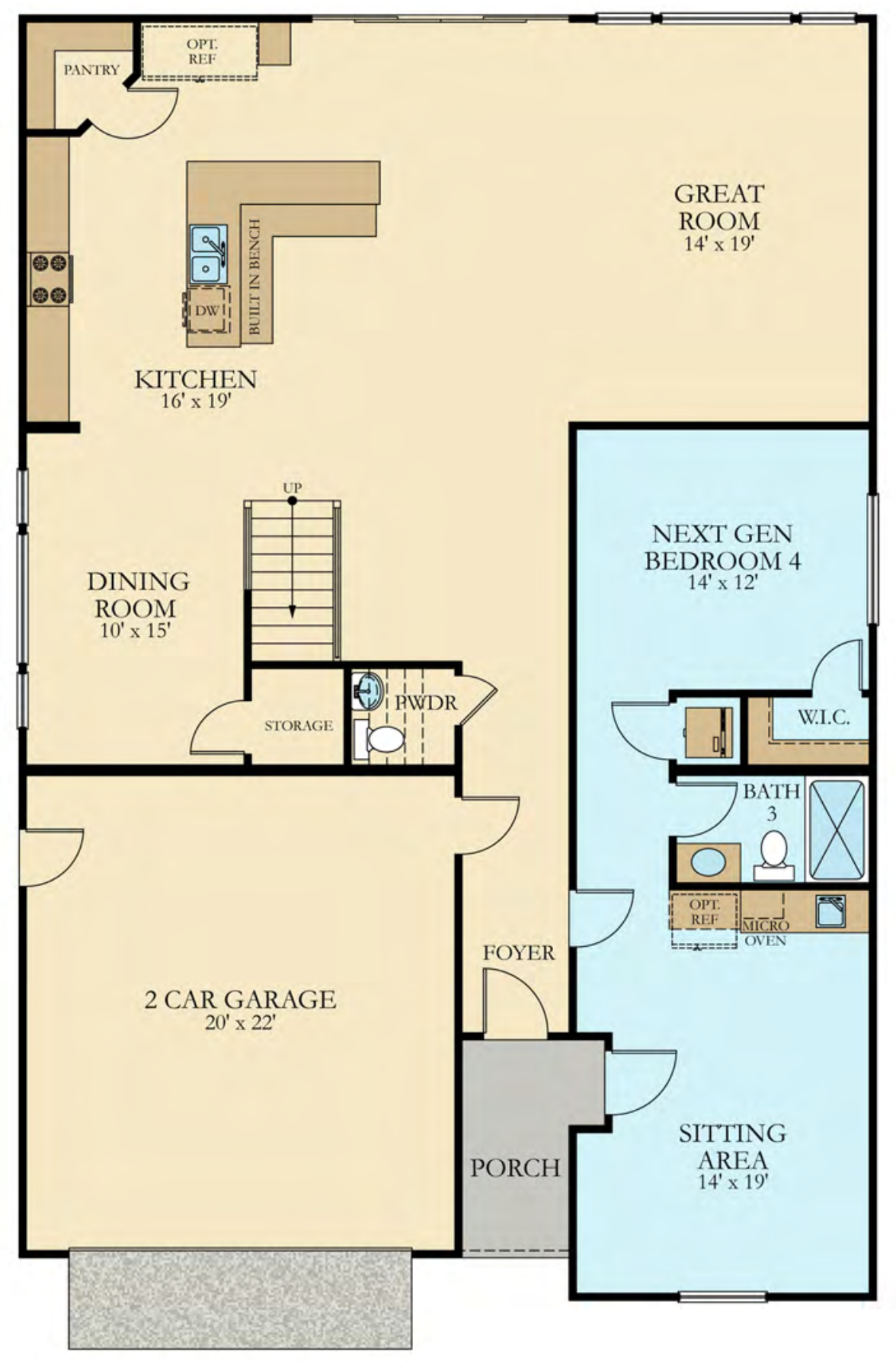
SECOND FLOOR

The Overture, Plan 4025

FIRST FLOOR

SECOND FLOOR

The Rhapsody, Plan 4027

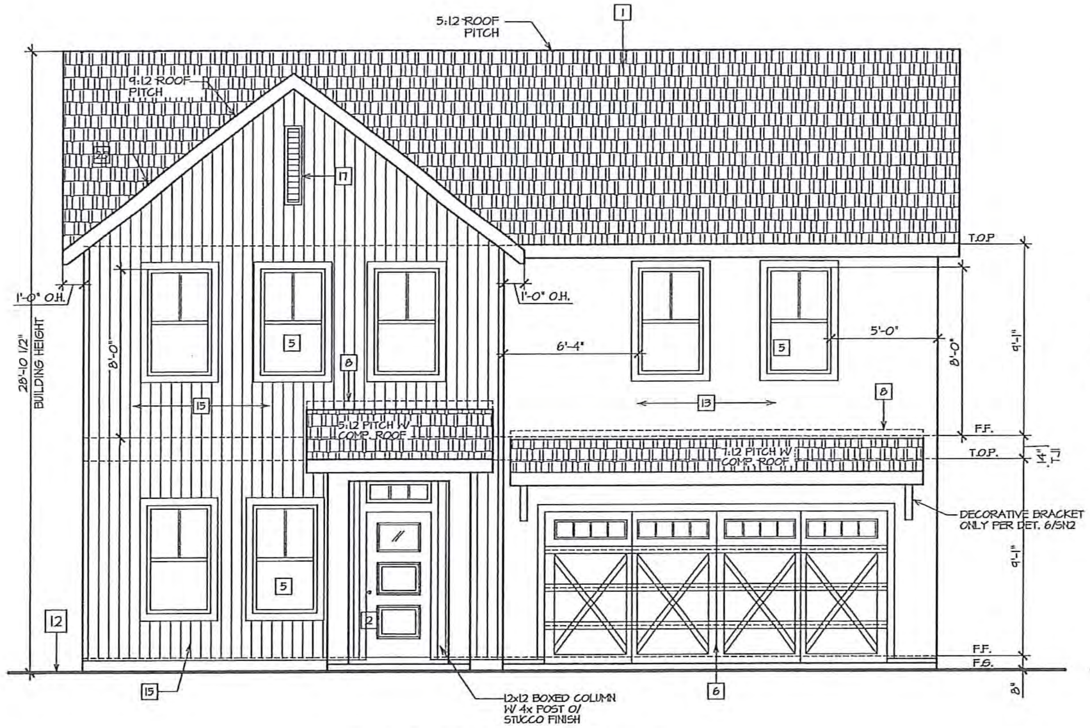


FIRST FLOOR

SECOND FLOOR

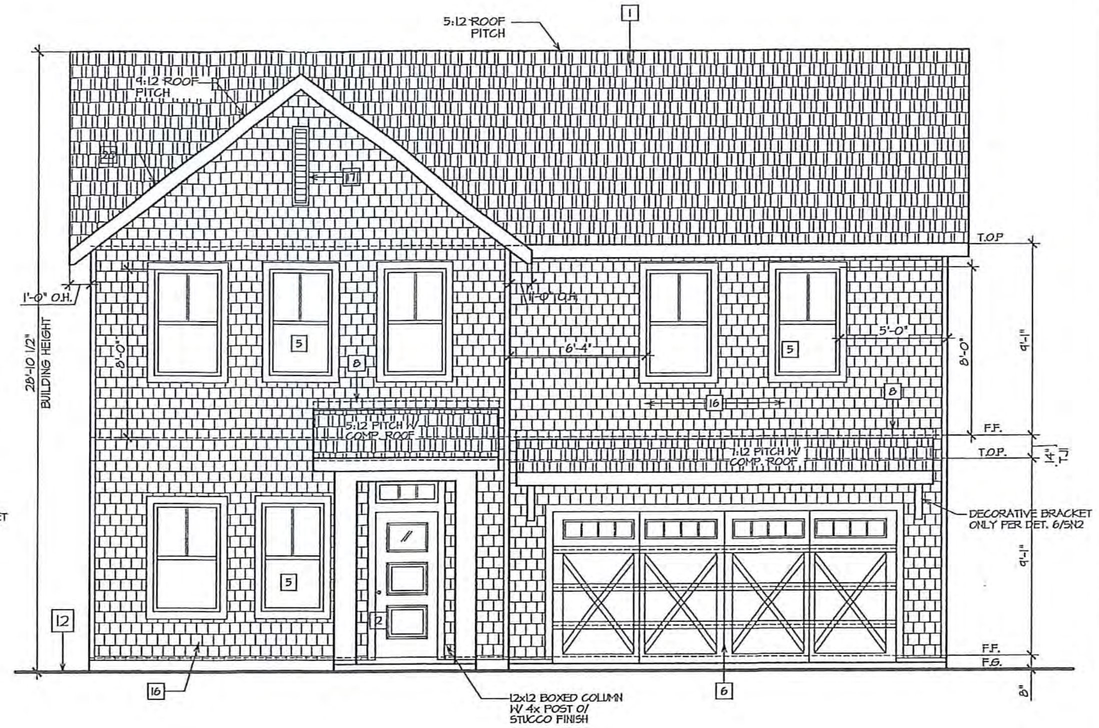
LENNAR

LENNAR
REV. 20.07.19
PLAN 4024 - NO FURNITURE



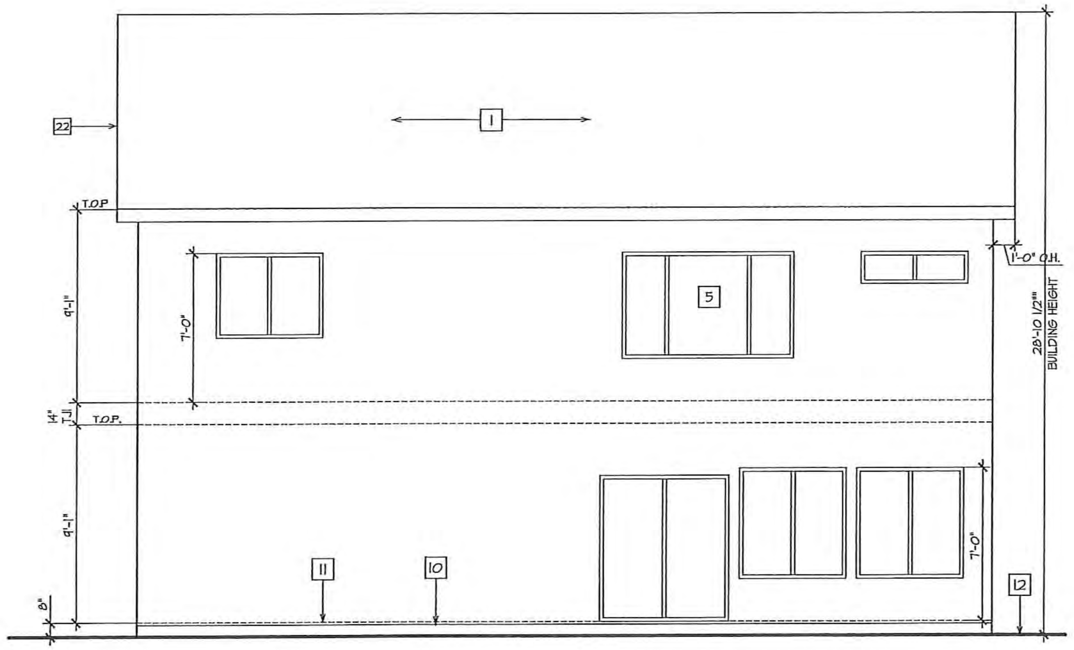
FRONT ELEV. A

SCALE: 1/4" = 1'-0"



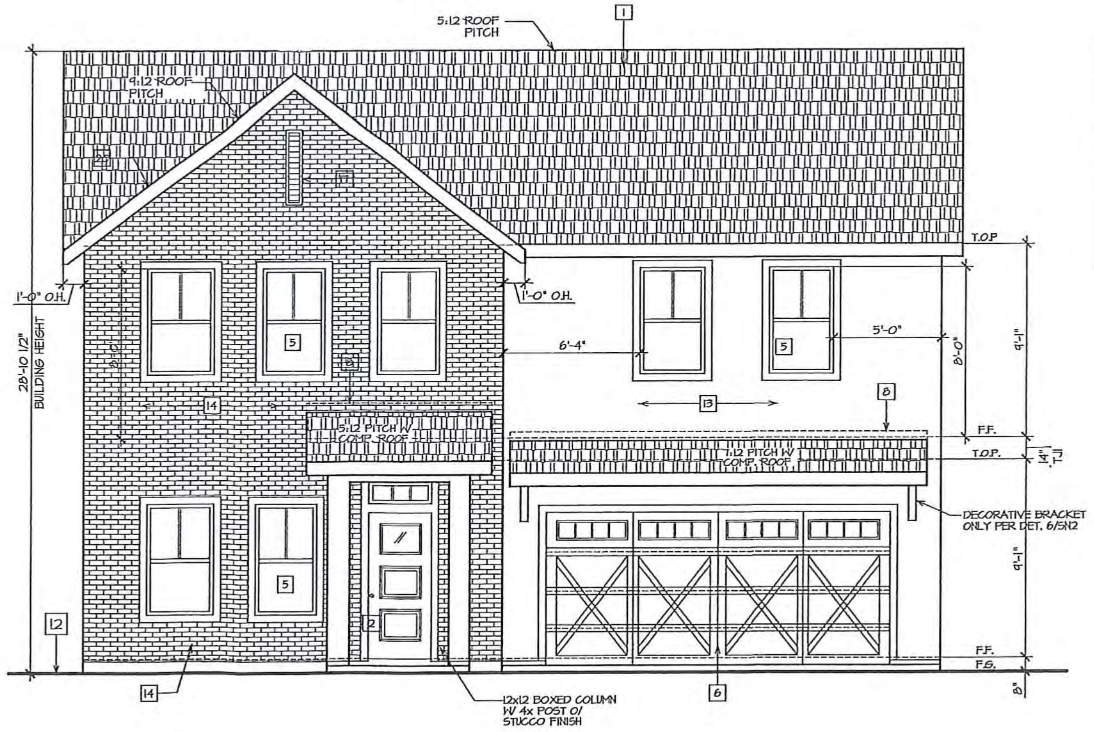
FRONT ELEV. B

SCALE: 1/4" = 1'-0"



TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"



FRONT ELEV. C

SCALE: 1/4" = 1'-0"

☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT O/ ROOF SHEATHING OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT. (ROOF EMMITANCE IS 0.85)
	(NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-4053.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH W/ 6 FEET MIN. MOUNTING HT.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-5.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 6" SLOPE AWAY FOR 10' FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (1" FOAM IS REQUIRED TO BE R-4 MIN.)
	ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL
	(NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	CULTURED STONE/BRICK MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL VERTICAL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	HARDIE SHINGLE SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-2290) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE BERMUDA SHUTTER PER ELEVATION. INSTALL PER MANUFACTURER INSTALLATION INSTRUCTIONS.
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES W/ DRIP EDGE FLASHING.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 6x6 POST WITH STUCCO FINISH
24	APPROVED WEATHER PROOF EXTERIOR WALL LIGHT

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

City of Clovis - Planning and Development Services - Building Division
Plans Approved Under the 2016 California Building Codes
16SPN
DEC 10 2019
Subject to Field Approval, Laws, Codes, and Ordinances
Approved With Noted Corrections

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS

PLAN 7515 (PERSIMMON)

DATE	PROJECT
APRIL 5, 2019 REV. AUG. 7, 2019	CLEMENTINE SERIES

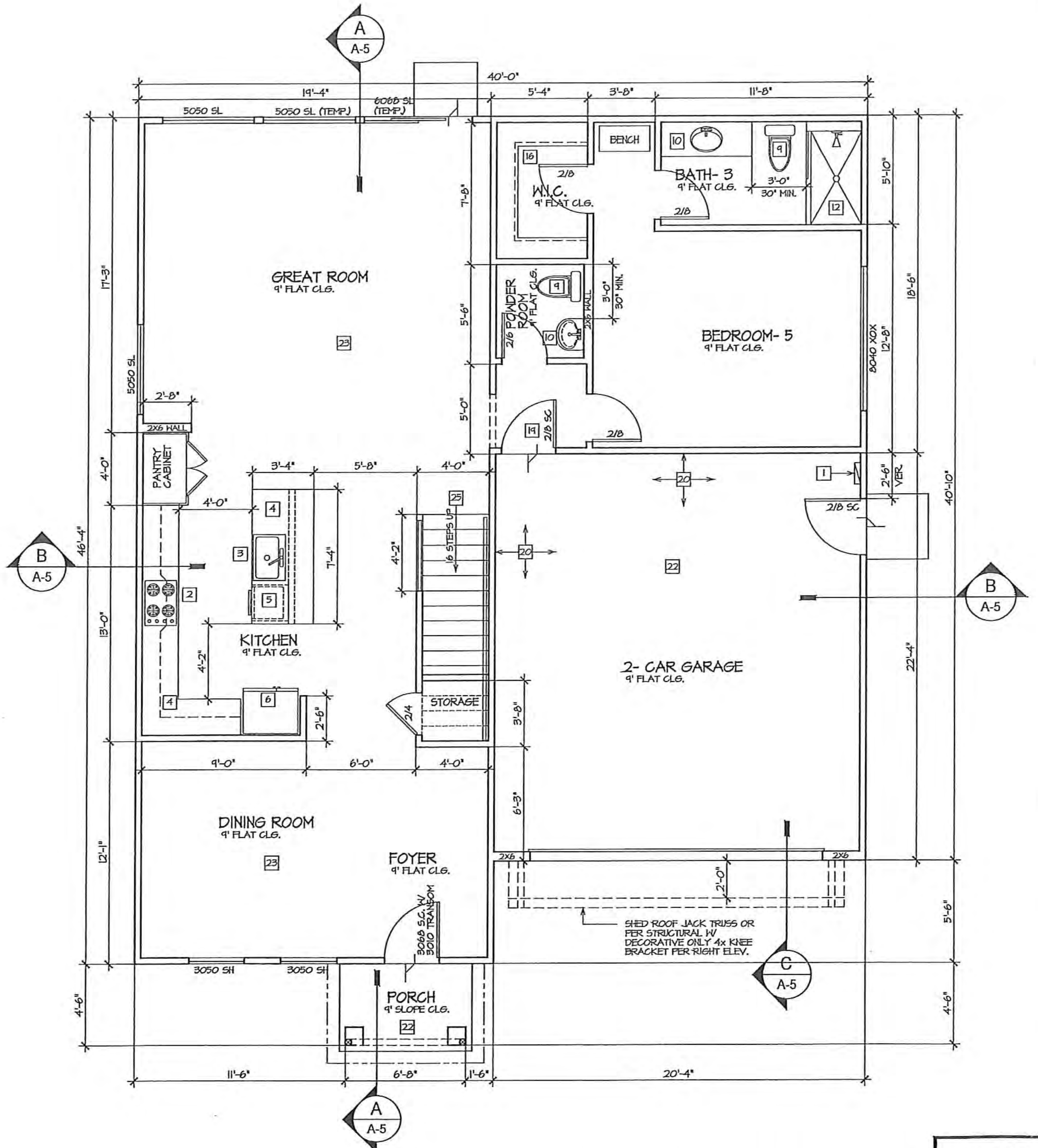
LENNAR

8080 N. PALM AVE. SUITE 110, FRESNO, CA. 93711 PHONE (559) 447-3400

SHEET NO.

A-3

OF SHEETS



FIRST FLOOR PLAN 1,287 SQ. FT.

SCALE: 1/4" = 1'-0"

Residential Site Plan Review Number 17-20

FIRST FLOOR ——— 1,287 SQ. FT.
SECOND FLOOR —— 1,698 SQ. FT.
RESIDENCE ——— 2,985 SQ. FT.
2-CAR GARAGE —— 454 SQ. FT.
COVERED PORCH —— 30 SQ. FT.
PATIO ——— 0 SQ. FT.

FLOOR PLAN KEY NOTES:

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	DRYER SPACE- PROVIDE BACKDRAFT DAMPER AT DRYER VENT TERMINATION. DRYER VENT SHALL EXHAUST MIN. 4"φ DUCT DIRECTLY TO THE EXTERIOR.
8	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
9	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
10	WALL TYPE LAVATORY OR LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW PER PLAN. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
11	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
12	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
14	HOSE BIB- PROVIDE NON REMOVABLE BACK FLOW PREVENTERS. REFER TO PLUMBING PLAN FOR EXACT LOCATION.
15	LINEN W/ 5 STACK SHELVES (12" MIN.)
16	CLOTHES CLOSET WITH SHELF AND POLE
17	PANTRY WITH 5 STACK SHELVES (16" MIN.)
18	30"x30" ATTIC ACCESS WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. ALL ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS.
19	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
20	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED. (MAY USED 1/2" MIN. GYP. BD. AT ALL LOCATIONS THAT IS NOT BETWEEN THE RESIDENCE AND GARAGE.)
21	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
22	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
23	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN
24	LANDINGS MAY NOT BE LOWER THAN 1.5" MEASURED FROM TOP OF THRESHOLD FOR OUT-SWINGING DOORS. LANDINGS MAY NOT BE LOWER THAN 7.75" MEASURED FROM TOP OF THRESHOLD FOR IN-SWINGING DOORS AND SLIDING DOORS. EXCEPTION: STORM AND SCREEN DOORS ARE PERMITTED TO SWING OVER ALL EXTERIOR STAIRS AND LANDINGS.
25	STAIR- MIN. 10" TREAD AND 7 3/4" MAX. RISER WITH MIN. 36" CLEAR WIDTH PER DET. 1/A-2
26	WOOD FLOOR - 3/4" THICK PLYWOOD SHEATHING OVER FLOOR JOIST
27	BEAM/ HEADER OUTLINE- REFER TO FLOOR/ ROOF FRAMING PLAN
28	DUCT CHASE- REFER TO MECHANICAL PLAN

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 OF GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
•High quality insulation installation (QII)
•IAQ mechanical ventilation
Cooling System Verifications:
•Minimum Airflow
•Verified EER
•Verified SEER
•Verified Refrigerant Charge
•Fan Efficacy Watts/CFM
HVAC Distribution System Verifications:
•Duct Sealing
•Low-leakage Air Handling Unit
Domestic Hot Water System Verifications:
•— None —
REQUIRED SPECIAL FEATURES
•PV System: 2.1 kWdc

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSAB125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.21	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR	0.30	0.23

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL (2x4)	R-13 W/ NO FOAM
GARAGE INT. WALL (2x6)	R-19 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY/KNEE WALL	R-19
ROOF W/ Radiant Barrier	R-38
ROOF @ FAU W/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 E.F.
REFER TO CFIR FOR MORE DETAILS AND INFORMATION	

City of Clovis - Planning and Development Services
16SPN
DEC 10 2019
Approved
Subject to Field Codes, and Ordinances With Noted Corrections - Building

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 7515 (PERSIMMON)
PROJECT
CLEMENTINE SERIES
DATE
APRIL 5, 2019
REV. AUG. 7, 2019

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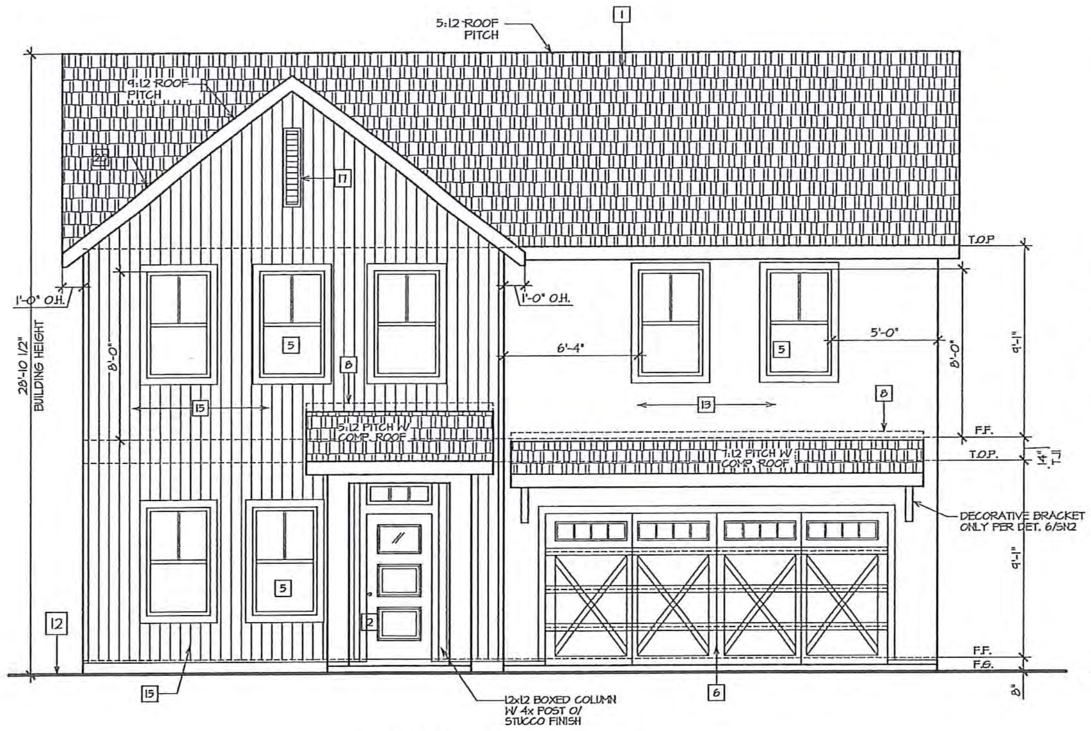
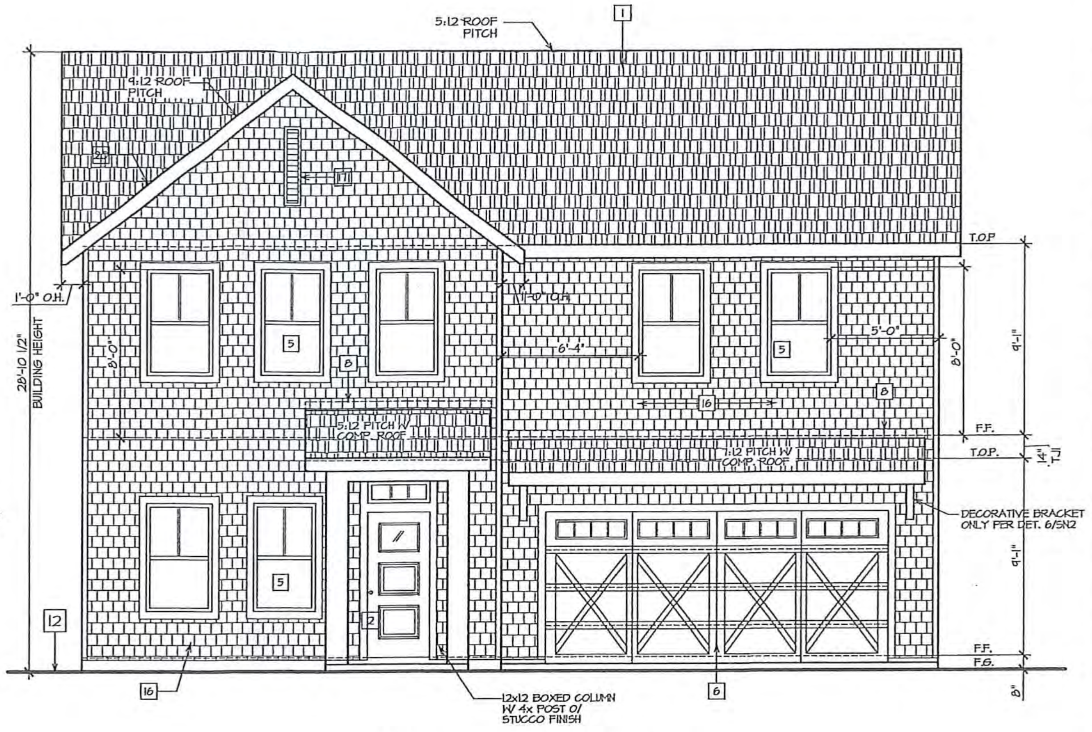
SHEET NO.
A-1
OF SHEETS



FRONT ELEV. A

SCALE: 1/4" = 1'-0"



FRONT ELEV. B

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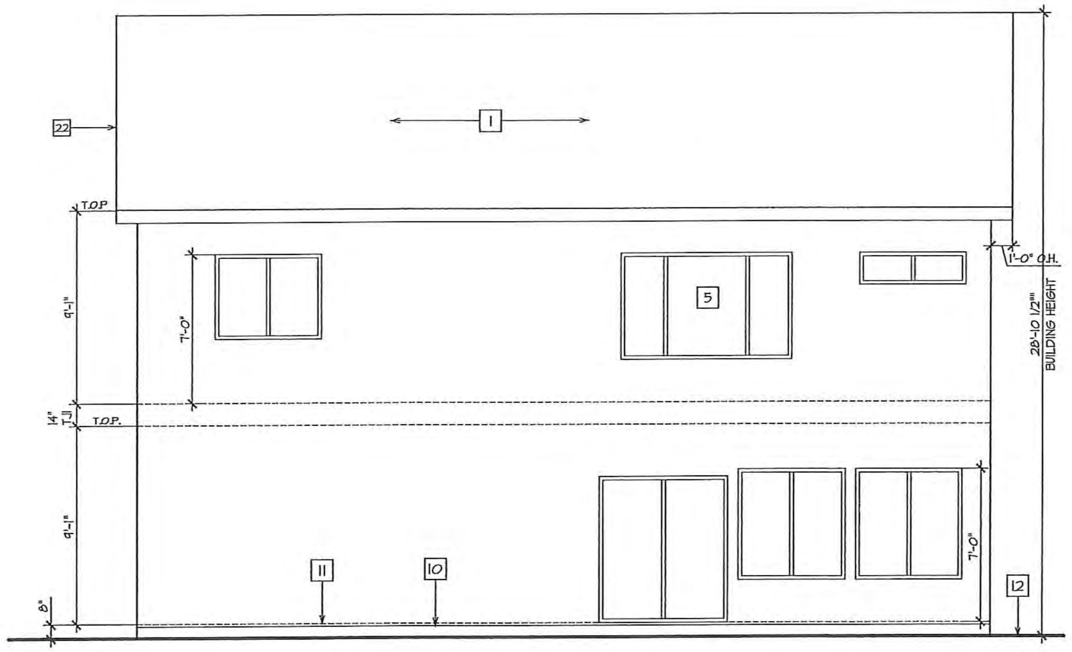
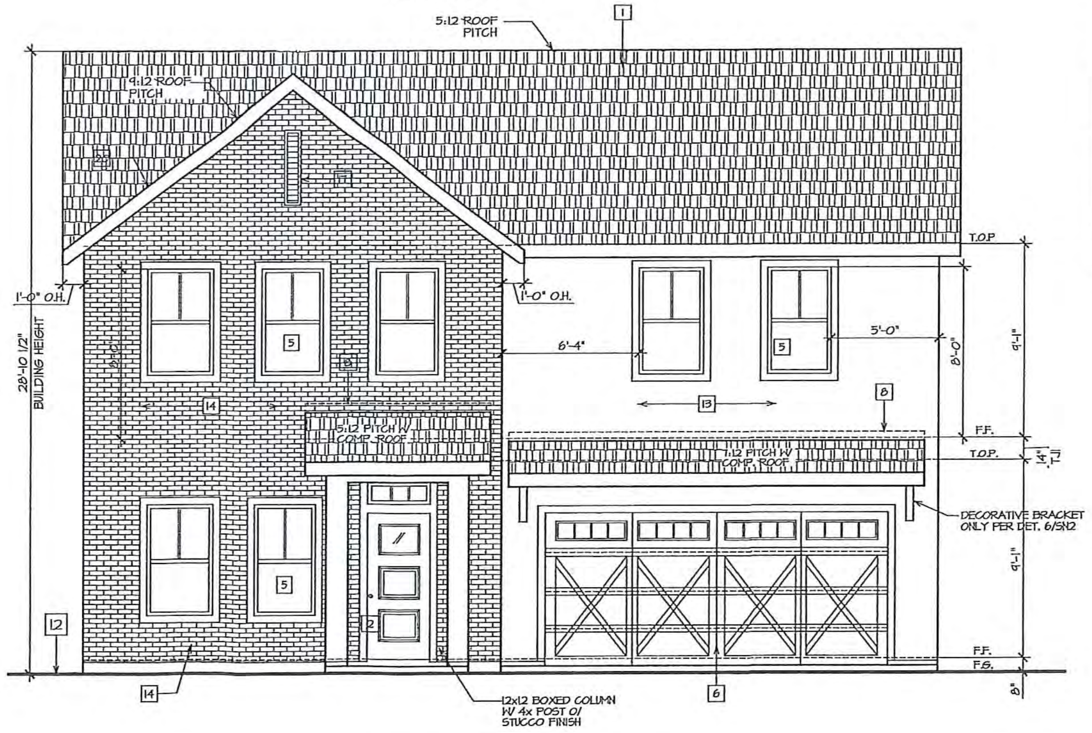


TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"



FRONT ELEV. C

SCALE: 1/4" = 1'-0"

☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT O/ ROOF SHEATHING OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT. (ROOF EMMITANCE IS 0.85) (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH W/ 6 FEET MIN. MOUNTING HT.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-5.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 6" SLOPE AWAY FOR 10' FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (1" FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	CULTURED STONE/BRICK MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL VERTICAL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	HARDIE SHINGLE SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-2290) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE BERMUDA SHUTTER PER ELEVATION. INSTALL PER MANUFACTURER INSTALLATION INSTRUCTIONS.
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES W/ DRIP EDGE FLASHING.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 6x6 POST WITH STUCCO FINISH
24	APPROVED WEATHER PROOF EXTERIOR WALL LIGHT

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

City of Clovis - Planning and Development Services - Building Division
Plans Approved Under the 2016 California Building Codes
16SPN
DEC 10 2019
Subject to Field Approval,
Laws, Codes, and Ordinances
Approved With Noted Corrections

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REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
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CLOVIS
PLAN 7515 (PERSIMMON)

DATE	PROJECT
APRIL 5, 2014 REV. AUG. 7, 2014	CLEMENTINE SERIES

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SHEET NO.
A-3
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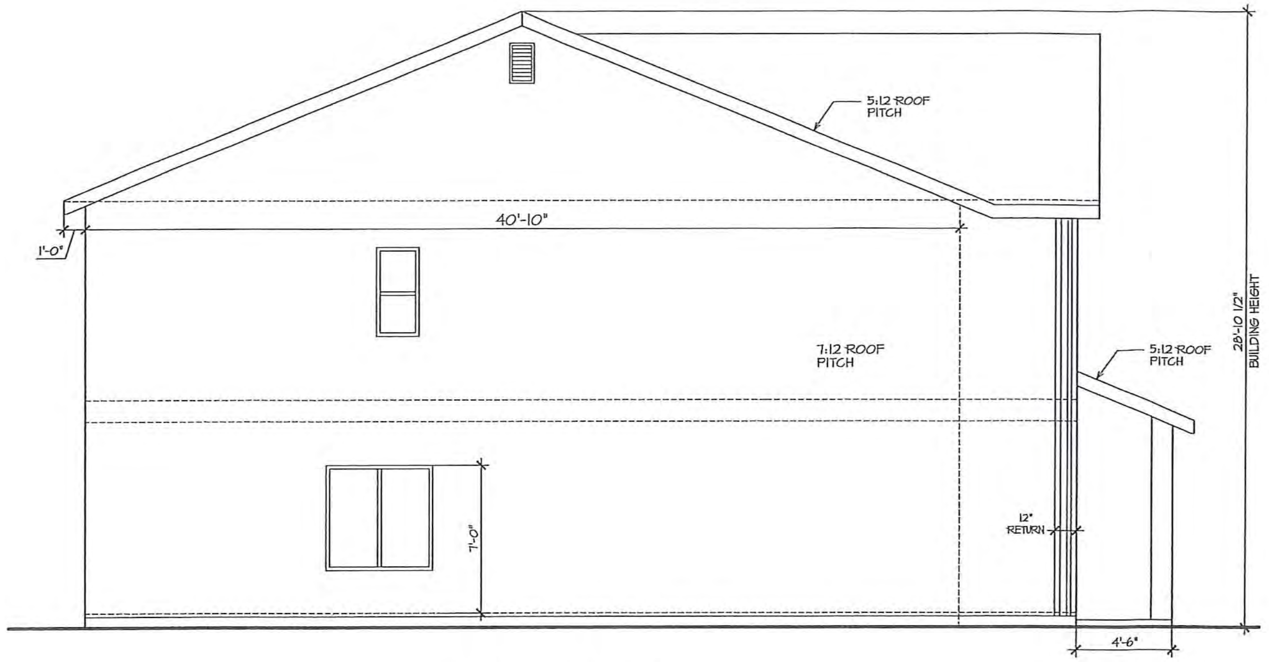
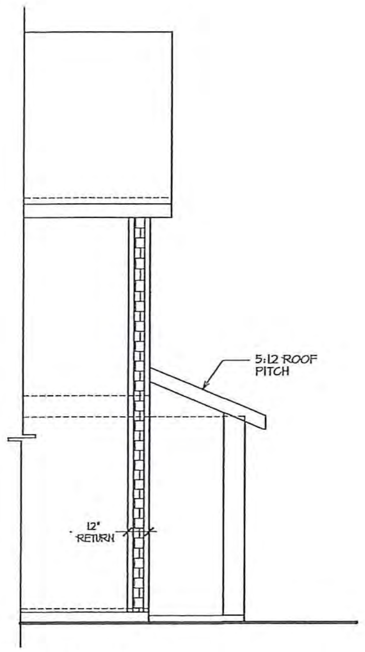


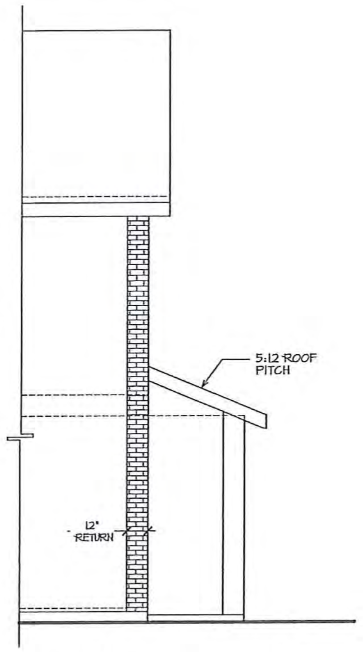
LEFT ELEV.

SCALE: 1/4" = 1'-0"



PARTIAL
LEFT ELEV. B

SCALE: 1/4" = 1'-0"



PARTIAL
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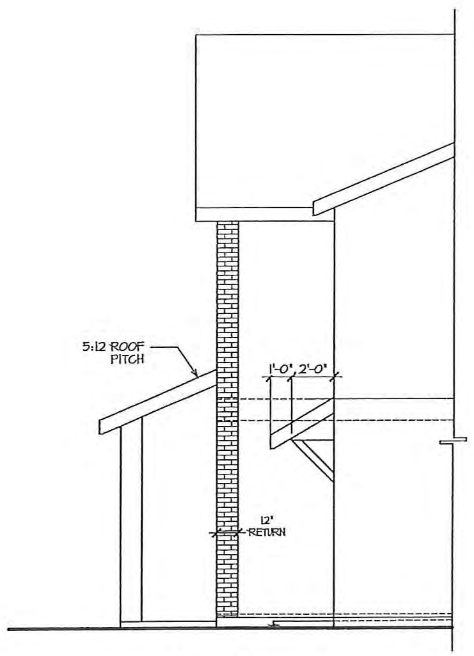

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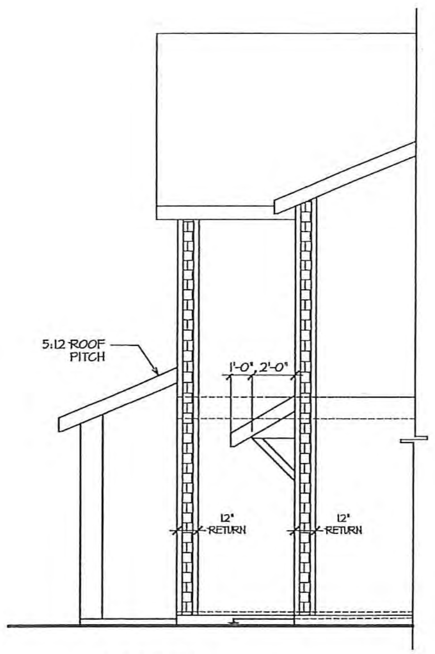

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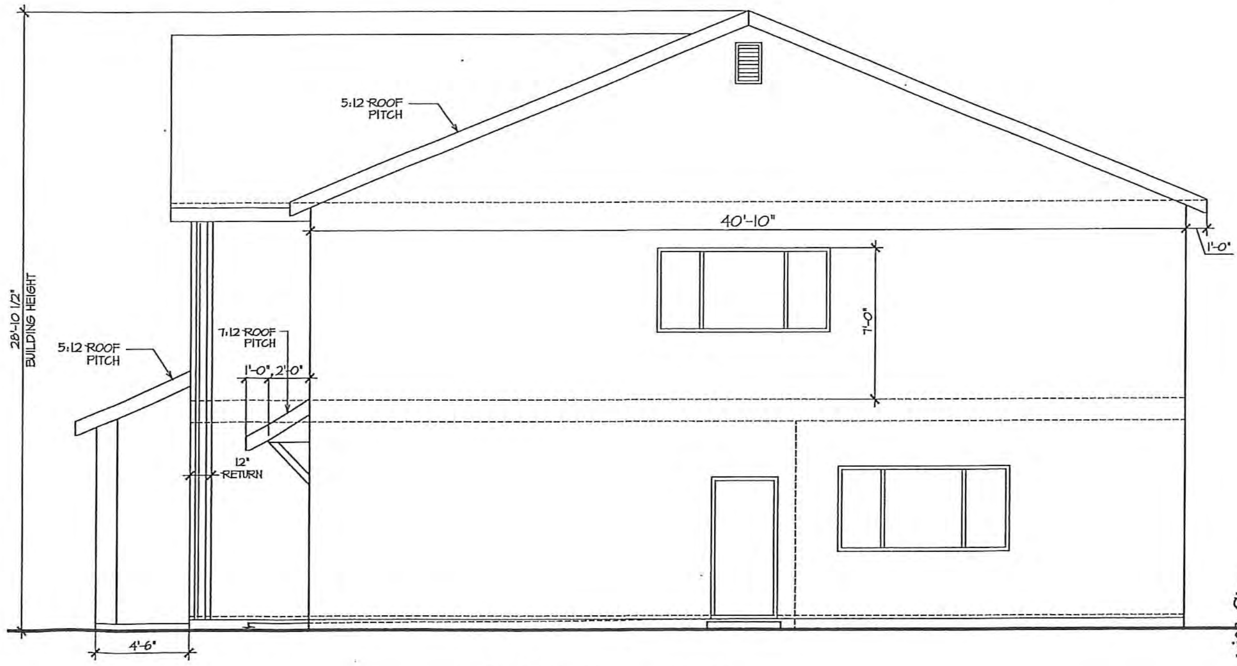

RIGHT ELEV. A

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
16SRN
DEC 10 2019
Approved with Noted Corrections

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1		
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CLOVIS
PLAN 7515 (PERSIMMON)

DATE
APRIL 5, 2019
REV. AUG. 7, 2019

PROJECT
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SHEET NO.
A-3.1
OF SHEETS

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13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (1" FOAM IS REQUIRED TO BE R-4 MIN.)
	ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL
	(NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	CULTURED STONE/BRICK MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL VERTICAL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
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19	DECORATIVE BERMUDA SHUTTER PER ELEVATION. INSTALL PER MANUFACTURER INSTALLATION INSTRUCTIONS.
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES W/ DRIP EDGE FLASHING.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 6x6 POST WITH STUCCO FINISH
24	APPROVED WEATHER PROOF EXTERIOR WALL LIGHT
25	DECORATIVE 4x CANOPY BRACKET W/ 4x TRELLIS PER DET. 10/SD3 ON STRUCTURAL DETAIL.

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL
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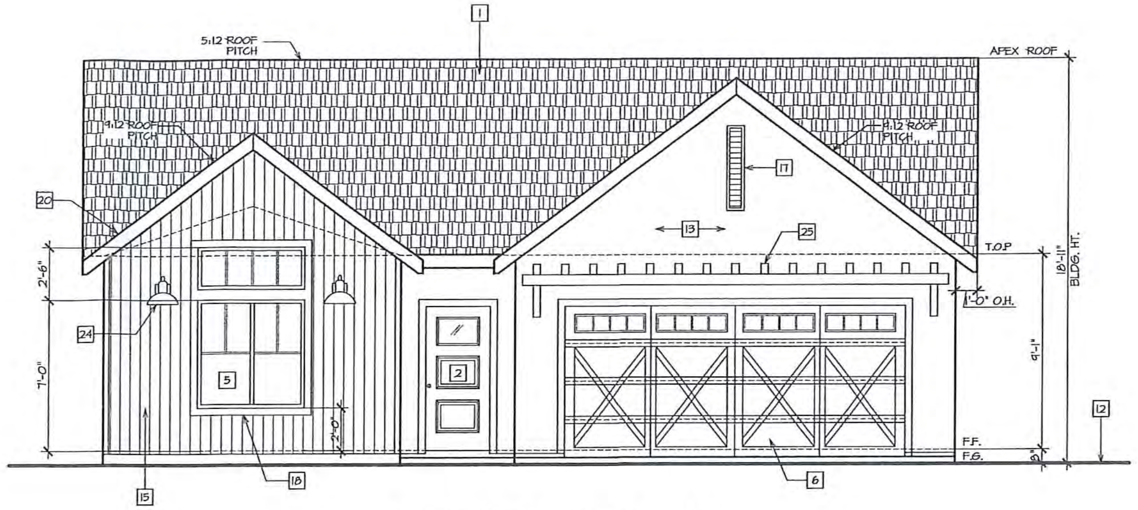
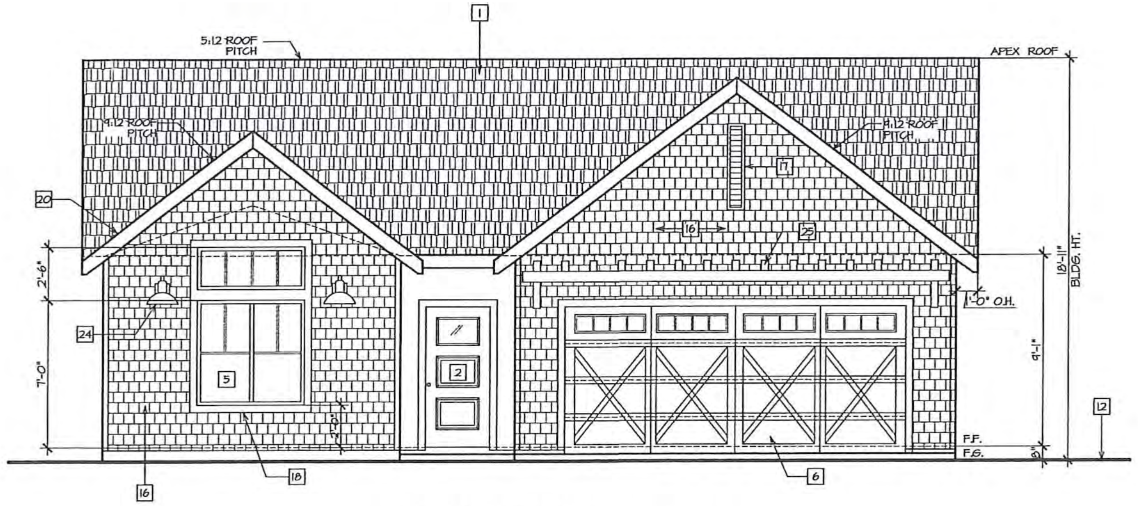


FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



FRONT ELEV.- B

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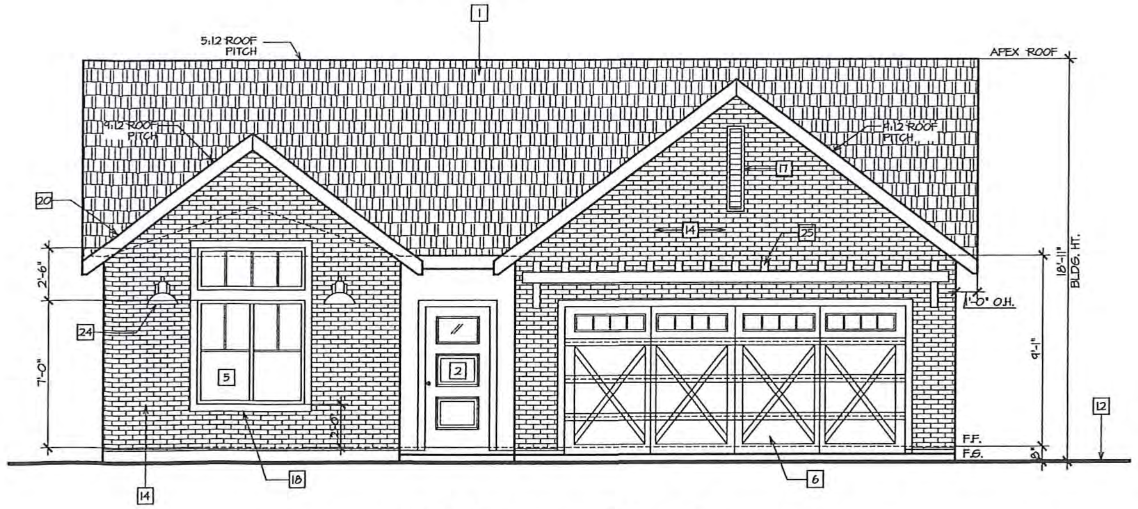


FRONT ELEV.- C

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
Plans Approved Under the 2016 California Building Codes
16SPN
OCT 2 8 2019
Subject To Field Approval, Laws, Codes, and Ordinances
Approved With Noted Corrections

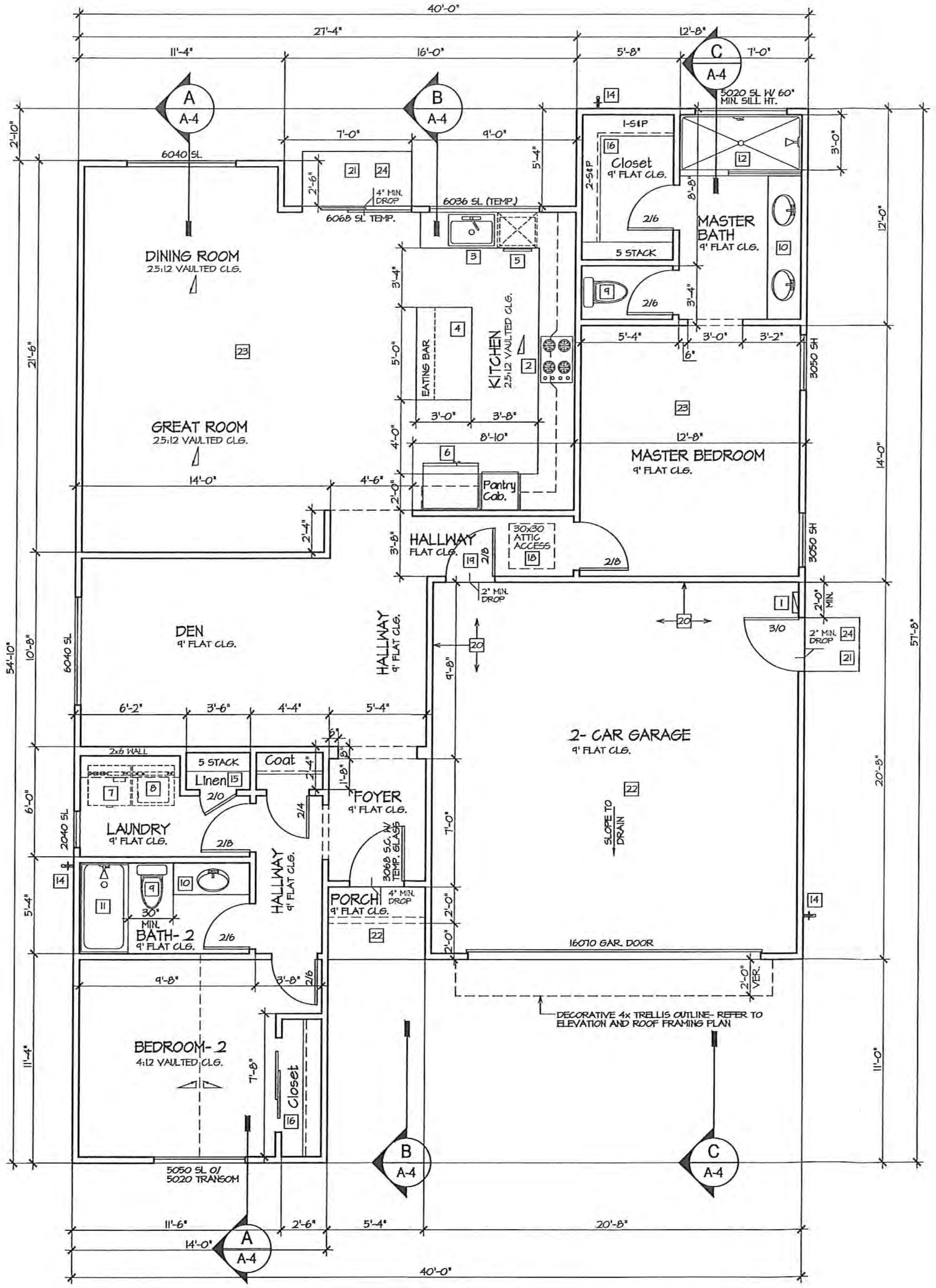
REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 7511 (PLUM)

DATE
APRIL 5, 2019
PROJECT
CLEMENTINE SERIES

LENNAR®
8080 N. PALM AVE. SUITE 110, FRESNO, CA. 93711 PHONE (559) 447-3400

SHEET NO.
A-2
OF SHEETS



FLOOR PLAN 1,460 SQ. FT.

SCALE: 1/4" = 1'-0"

Residential Site Plan Review Number 17-20

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	DRYER SPACE- PROVIDE BACKDRAFT DAMPER AT DRYER VENT TERMINATION. DRYER VENT SHALL EXHAUST MIN. 4"φ DUCT DIRECTLY TO THE EXTERIOR.
8	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
9	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
10	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
11	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
12	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
14	HOSE BIB- PROVIDE NON-REMOVABLE BACK FLOW PREVENTERS. REFER TO PLUMBING PLAN FOR EXACT LOCATION.
15	LINEN W/ 5 STACK SHELVES (12" MIN.)
16	CLOTHES CLOSET WITH SHELF AND POLE
17	PANTRY WITH 5 STACK SHELVES (16" MIN.)
18	22"x30" MIN. ATTIC ACCESS & 30"x30" FOR FURNACE WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. "ALL ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS."
19	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
20	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED. (MAY USED 1/2" MIN. GYP. BD. AT ALL LOCATIONS THAT IS NOT BETWEEN THE RESIDENCE AND GARAGE.)
21	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
22	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
23	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN
24	LANDINGS MAY NOT BE LOWER THAN 1.5" MEASURED FROM TOP OF THRESHOLD FOR OUT-SWINGING DOORS. LANDINGS MAY NOT BE LOWER THAN 7.75" MEASURED FROM TOP OF THRESHOLD FOR IN-SWINGING DOORS AND SLIDING DOORS. EXCEPTION: STORM AND SCREEN DOORS ARE PERMITTED TO SWING OVER ALL EXTERIOR STAIRS AND LANDINGS.

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 OF GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality insulation installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- — None —

REQUIRED SPECIAL FEATURES
- PV System: 2.0 kWdc

RESIDENCE ——— 1,450 SQ. FT.
2-CAR GARAGE —— 421 SQ. FT.
COVERED PORCH —— 11 SQ. FT.
PATIO ——— 0 SQ. FT.

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSAB125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.21	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR	0.30	0.23

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL (2x4)	R-13 W/ NO FOAM
GARAGE INT. WALL (2x6)	R-19 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY/KNEE WALL	R-19
ROOF w/ Radiant Barrier	R-38
ROOF @ FAU w/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 E.F.

REFER TO CFIR FOR MORE DETAILS AND INFORMATION

REV.	DATE	DESCRIPTION OF WORK
△		
△		
△		
△		
△		

CLOVIS
PLAN 7511 (PLUM)

DATE: APRIL 5, 2019
PROJECT: CLEMENTINE SERIES

LENNAR®
8080 N. PALM AVE. SUITE 110, FRESNO, CA. 93711 PHONE (559) 447-3400

SHEET NO.
A-1
OF SHEETS

☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT O/ ROOF SHEATHING OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH W/ 6 FEET MIN. MOUNTING HT.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-4.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 6" SLOPE AWAY FOR 10' FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (1" FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL. (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
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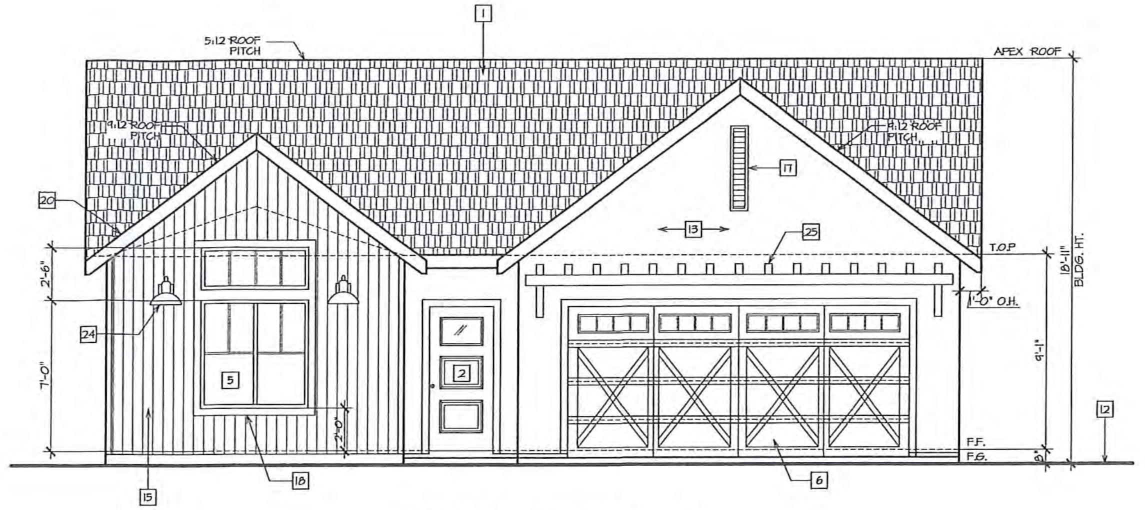
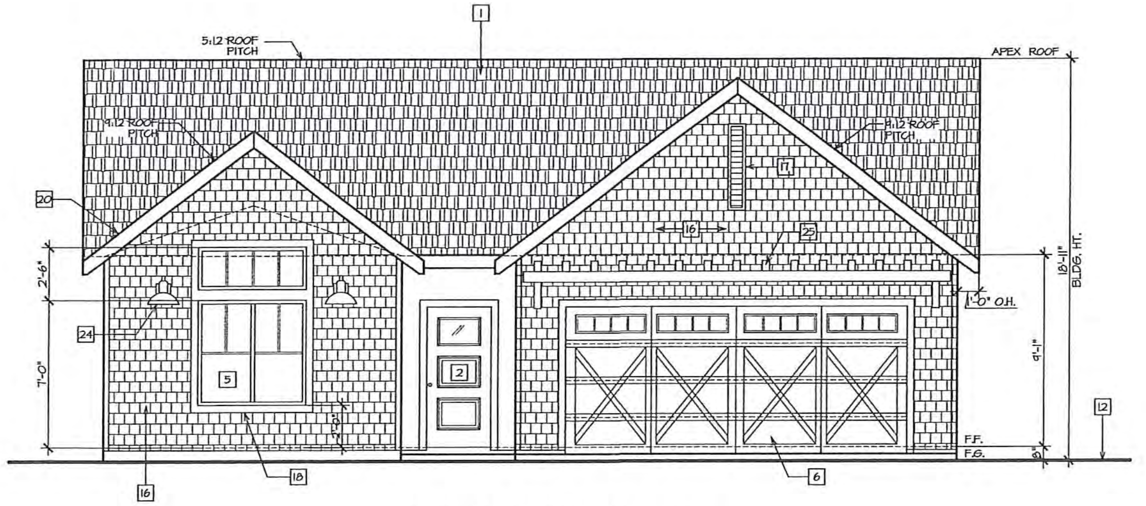


FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



FRONT ELEV.- B

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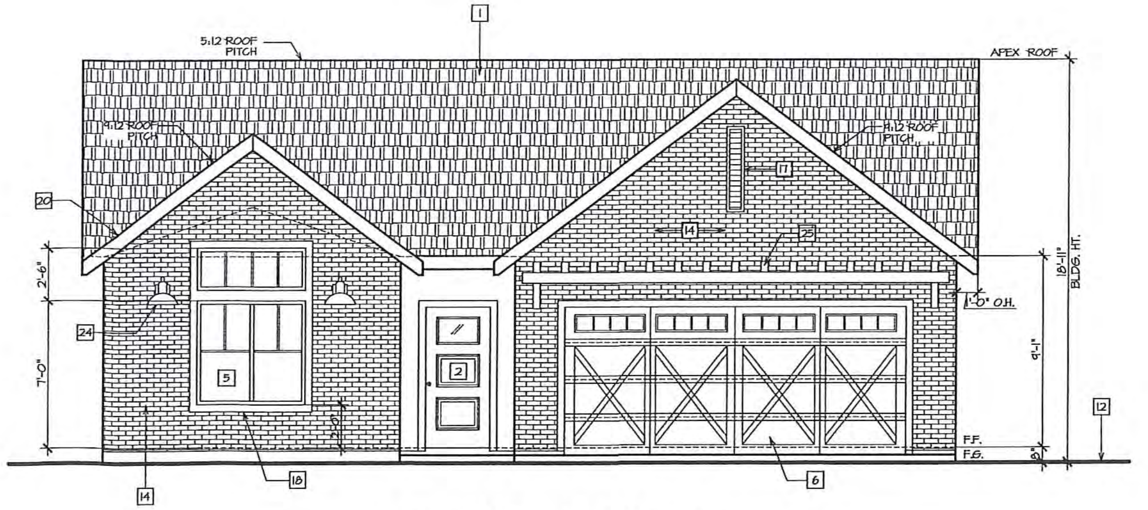

FRONT ELEV.- C

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
16SPN
OCT 28 2019
Approved With Noted Corrections

The information, arrangements and ideas represented within these drawings are and shall remain the property of LENNAR Homes. No part shall be copied, disclosed to others, or used in connection with any project without the written consent of LENNAR Homes.

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 7511 (PLUM)

DATE
APRIL 5, 2019

PROJECT
CLEMENTINE SERIES

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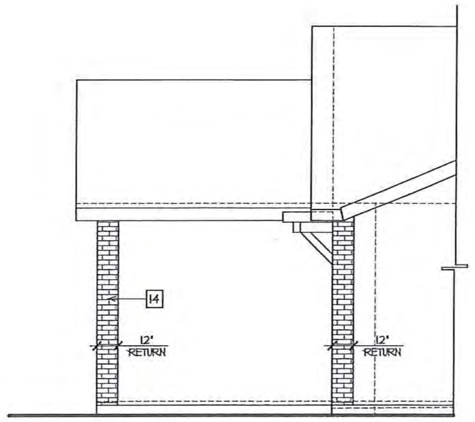
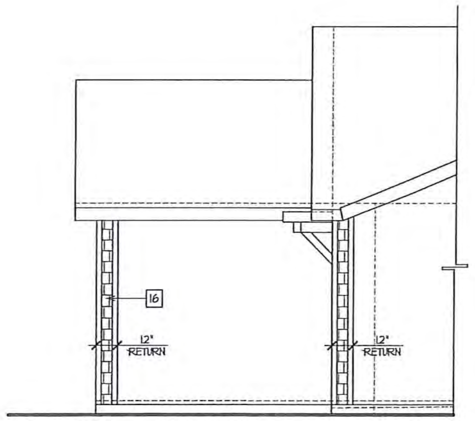
SHEET NO.
A-2
OF SHEETS



PARTIAL
RIGHT ELEV.- C
SCALE: 1/4" = 1'-0"



PARTIAL
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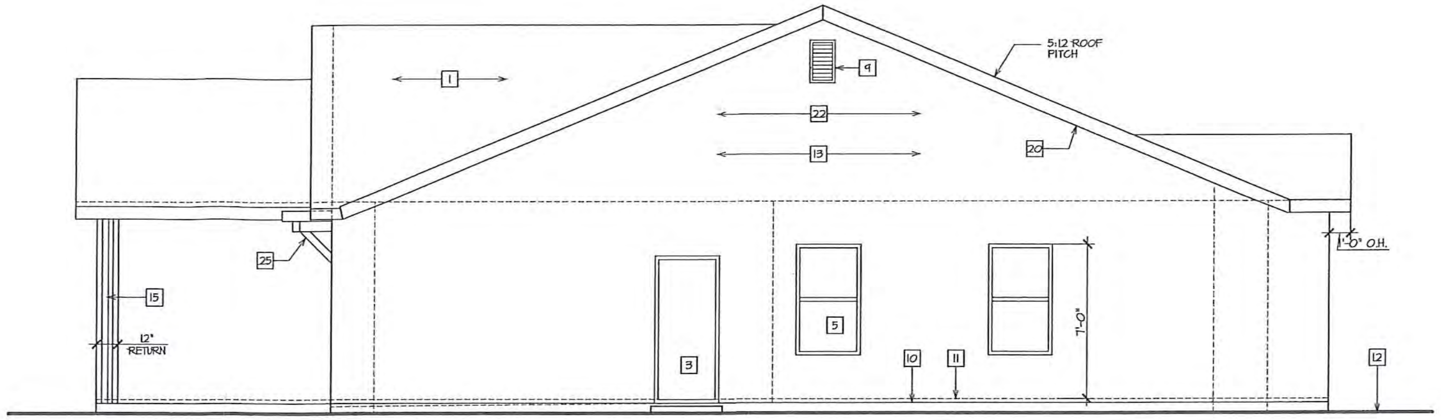
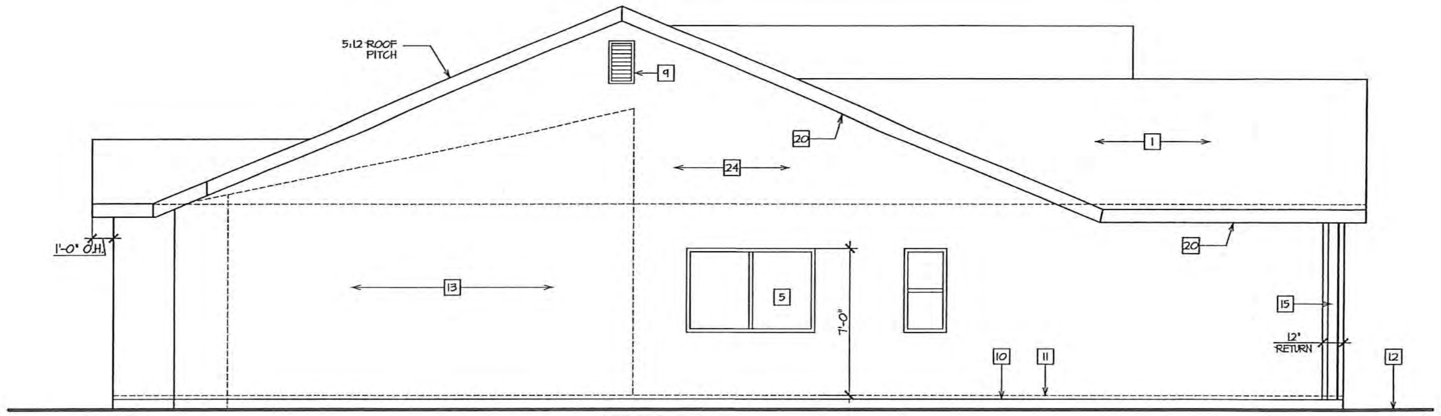


RIGHT ELEV.- A
SCALE: 1/4" = 1'-0"



LEFT ELEV.
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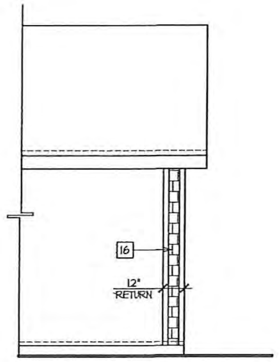
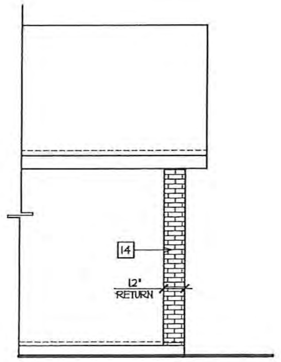
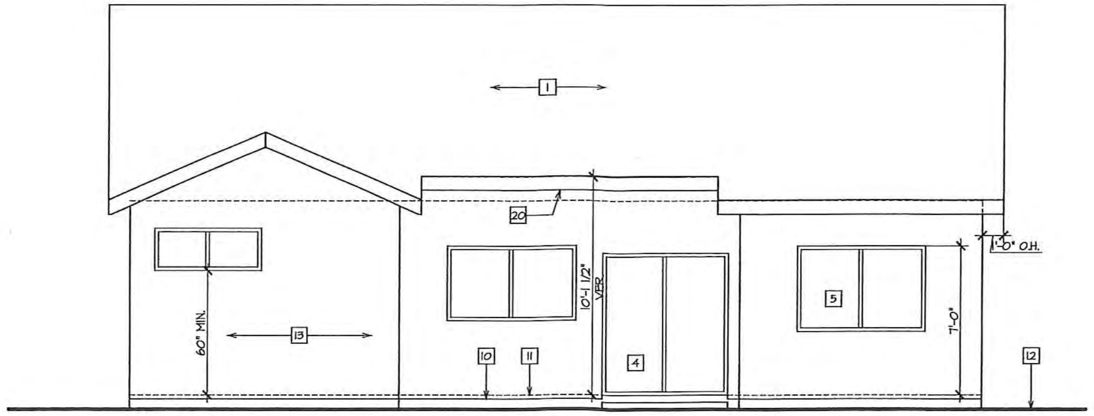


PARTIAL
LEFT ELEV.- B
SCALE: 1/4" = 1'-0"



PARTIAL
LEFT ELEV.- C
SCALE: 1/4" = 1'-0"



TYP. REAR ELEV.
SCALE: 1/4" = 1'-0"

☐	ELEVATION KEYNOTES
	SEE ELEVATION KEYNOTES ON SHEET A-2

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1310) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL
NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 7511 (PLUM)

DATE	PROJECT
APRIL 5, 2019	CLEMENTINE SERIES

LENNAR®
8080 N. PALM AVE. SUITE 110, FRESNO, CA. 93711 PHONE (559) 447-3400

SHEET NO.
A-2.1
OF SHEETS

☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT O/ ROOF SHEATHING OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT.
	(NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH W/ 6 FEET MIN. MOUNTING HT.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-4.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 6" SLOPE AWAY FOR 10' FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (1" FOAM IS REQUIRED TO BE R-4 MIN.)
	ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL
	(NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	CULTURED STONE/BRICK MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL VERTICAL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	HARDIE SHINGLE SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-2290) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE BERMUDA SHUTTER PER ELEVATION. INSTALL PER MANUFACTURER INSTALLATION INSTRUCTIONS.
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES W/ DRIP EDGE FLASHING.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 6x6 POST WITH STUCCO FINISH
24	APPROVED WEATHER PROOF EXTERIOR WALL LIGHT
25	SHED ROOF O/ ROOF SHEATHING W/ 2x4 DF #2 RAFTERS AT 24" O.C. O/ BUILT UP 4x BRACKET W/ 4x6 DF #2 HEADER PER DETAIL 11/SD3 ON STRUCTURAL PLAN. USE COMPOSITION ROOFING FOR ELEV.- A. METAL ROOFING FOR ELEV.- B & C.

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

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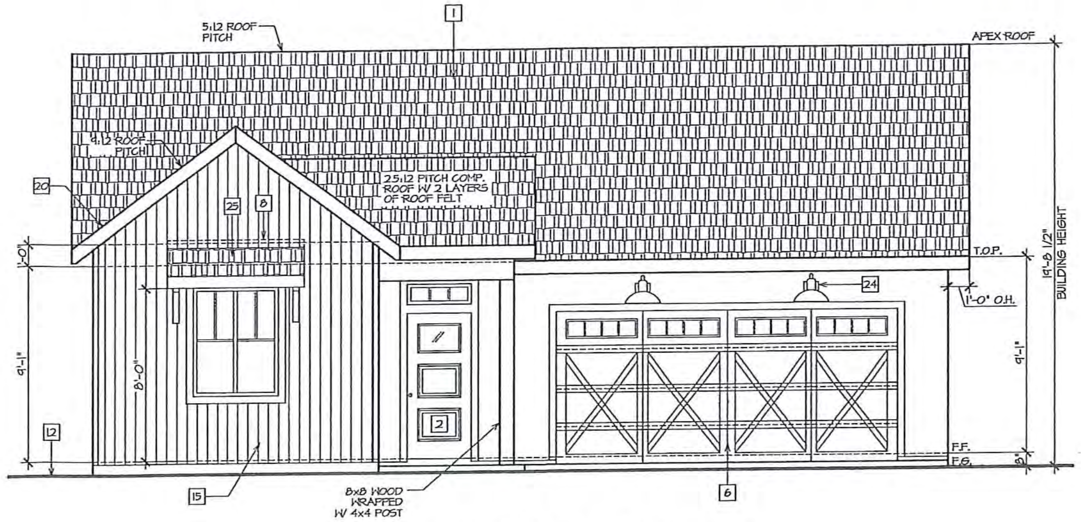
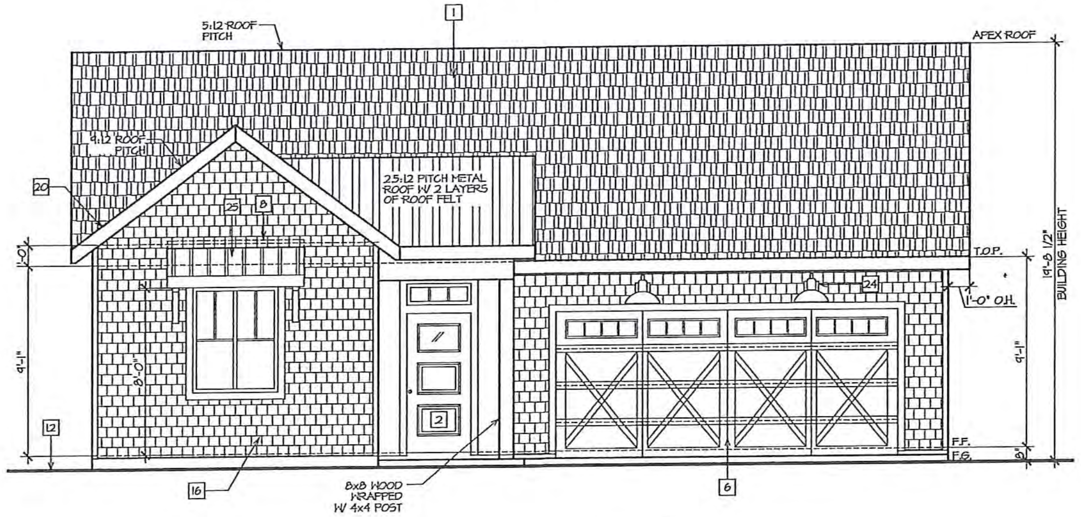


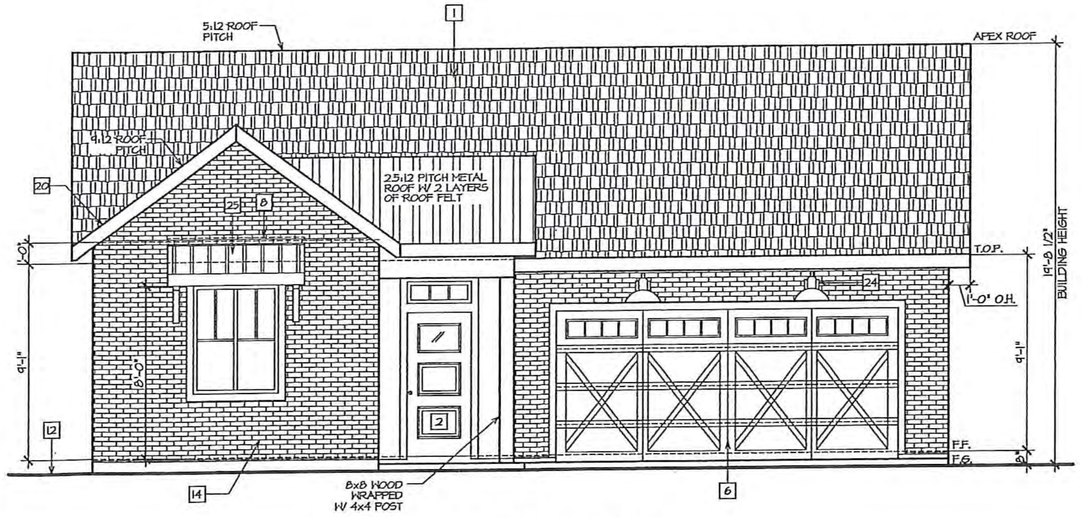
FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"



FRONT ELEV.- C

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services Division - Planning
Plans Approved Under the 2016 California Building Codes
16SPN
OCT 28 2019
Subject To Field Approval,
Laws, Codes, and Ordinances
Approved With Noted Corrections

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
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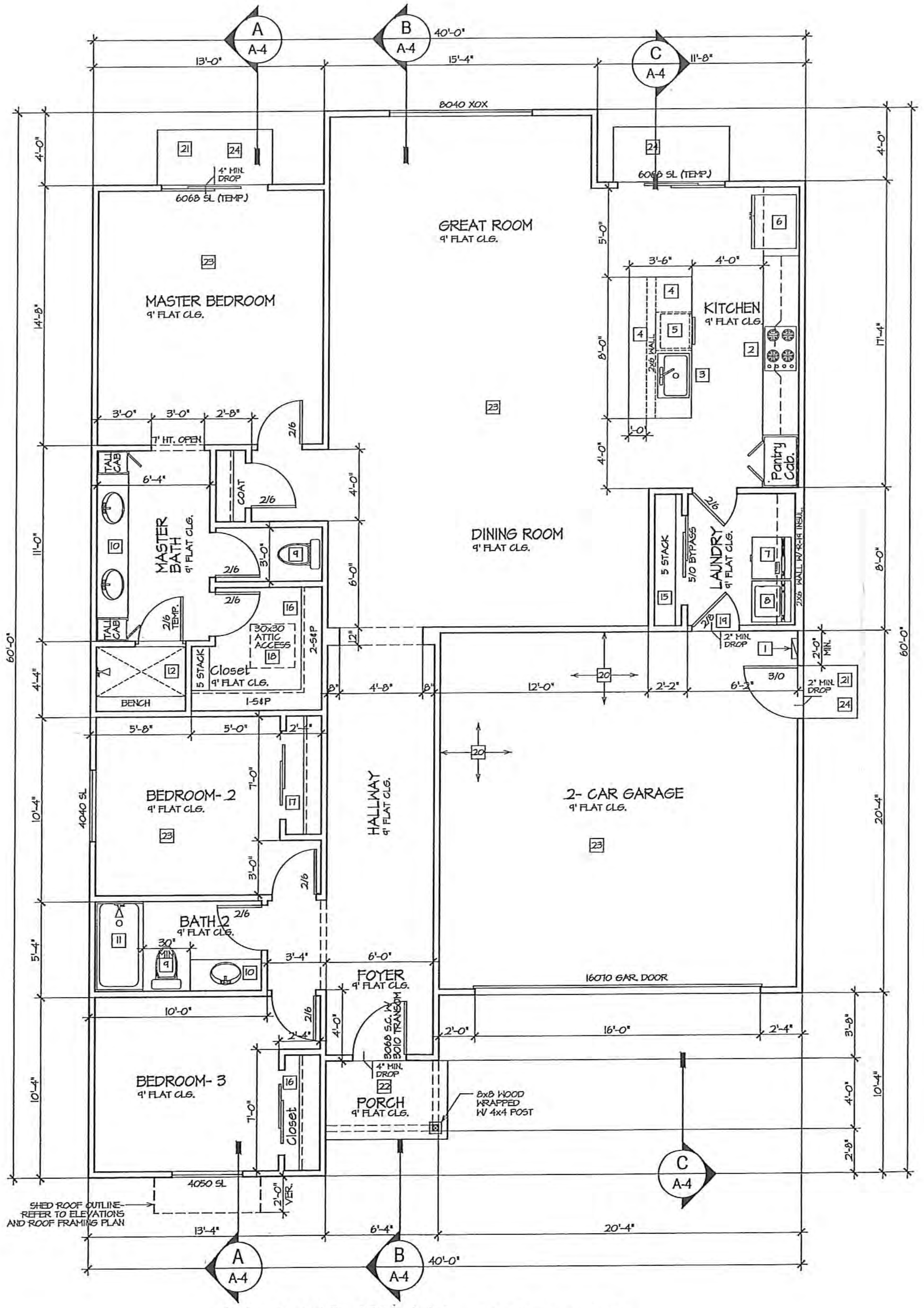
CLOVIS
PLAN 7512 (OLIVE)

DATE
APRIL 5, 2019

PROJECT
CLEMENTINE SERIES

LENNAR®
8080 N. PALM AVE. SUITE 110, FRESNO, CA. 93711 PHONE (559) 447-3400

SHEET NO.
A-2
OF SHEETS



FLOOR PLAN 1,635 SQ. FT.

SCALE: 1/4" = 1'-0"

Residential Site Plan Review Number 17-20

FLOOR PLAN KEY NOTES:

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	DRYER SPACE- PROVIDE BACKDRAFT DAMPER AT DRYER VENT TERMINATION. DRYER VENT SHALL EXHAUST MIN. 4"Φ DUCT DIRECTLY TO THE EXTERIOR.
8	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
9	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
10	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
11	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
12	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
14	HOSE BIB- PROVIDE NON-REMOVABLE BACK FLOW PREVENTERS. REFER TO PLUMBING PLAN FOR EXACT LOCATION.
15	LINEN W/ 5 STACK SHELVES (12" MIN.)
16	CLOTHES CLOSET WITH SHELF AND POLE
17	PANTRY WITH 5 STACK SHELVES (16" MIN.)
18	22"x30" MIN. ATTIC ACCESS & 30"x30" FOR FURNACE WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. "ALL ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS."
19	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
20	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED. (MAY USED 1/2" MIN. GYP. BD. AT ALL LOCATIONS THAT IS NOT BETWEEN THE RESIDENCE AND GARAGE)
21	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN SEE FOUNDATION PLAN
22	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
23	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN
24	LANDINGS MAY NOT BE LOWER THAN 1.5" MEASURED FROM TOP OF THRESHOLD FOR OUT-SWINGING DOORS. LANDINGS MAY NOT BE LOWER THAN 7.75" MEASURED FROM TOP OF THRESHOLD FOR IN-SWINGING DOORS AND SLIDING DOORS. <u>EXCEPTION:</u> STORM AND SCREEN DOORS ARE PERMITTED TO SWING OVER ALL EXTERIOR STAIRS AND LANDINGS.

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE <u>SHEET N-1</u> FOR TABLE 702.3.5 OF GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE <u>SHEET GB</u> FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality Insulation Installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- — None —

<u>REQUIRED SPECIAL FEATURES</u>
- PV System: 2.0 kWdc

RESIDENCE ——— 1,635 SQ. FT.
2-CAR GARAGE —— 413 SQ. FT.
COVERED PORCH —— 36 SQ. FT.
PATIO ———— 0 SQ. FT.

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSA B125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.21	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR	0.30	0.23

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL (2x4)	R-13 W/ NO FOAM
GARAGE INT. WALL (2x6)	R-19 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY/KNEE WALL	R-19
ROOF W/ Radiant Barrier	R-38
ROOF @ FAU W/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 EF.
REFER TO CFIR FOR MORE DETAILS AND INFORMATION	

16SPN
OCT 28 2019

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 7512 (OLIVE)

DATE	PROJECT
APRIL 5, 2019	CLEMENTINE SERIES

LENNAR®
8080 N. PALM AVE. SUITE 110, FRESNO, CA. 93711 PHONE (559) 447-3400

SHEET NO.
A-1
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11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
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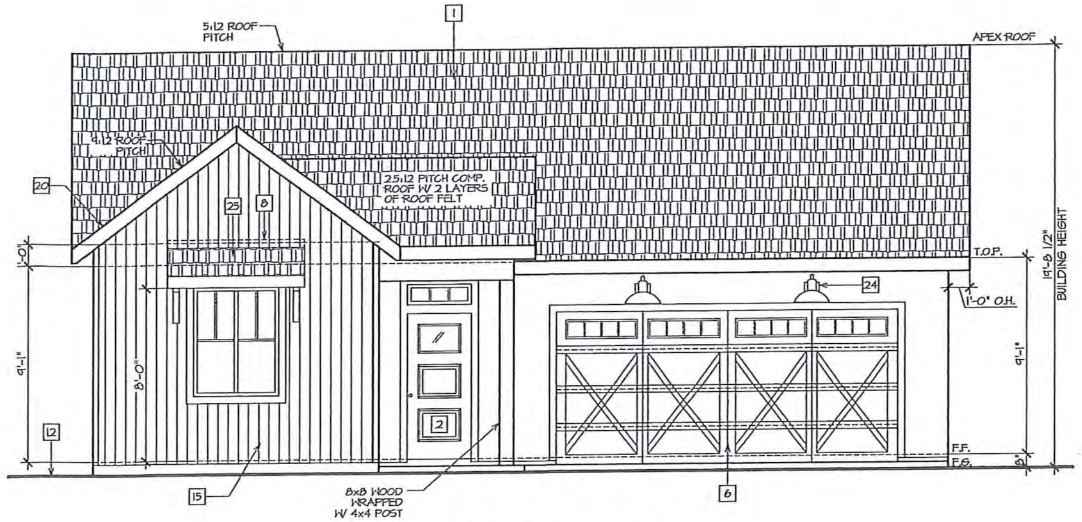
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE BERMUDA SHUTTER PER ELEVATION. INSTALL PER MANUFACTURER INSTALLATION INSTRUCTIONS.
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES W/ DRIP EDGE FLASHING.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 6x6 POST WITH STUCCO FINISH
24	APPROVED WEATHER PROOF EXTERIOR WALL LIGHT
25	SHED ROOF O/ ROOF SHEATHING W/ 2x4 DF #2 RAFTERS AT 24" O.C. O/ BUILT UP 4x BRACKET W/ 4x6 DF #2 HEADER PER DETAIL 11/SD3 ON STRUCTURAL PLAN. USE COMPOSITION ROOFING FOR ELEV.- A. METAL ROOFING FOR ELEV.- B & C.

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

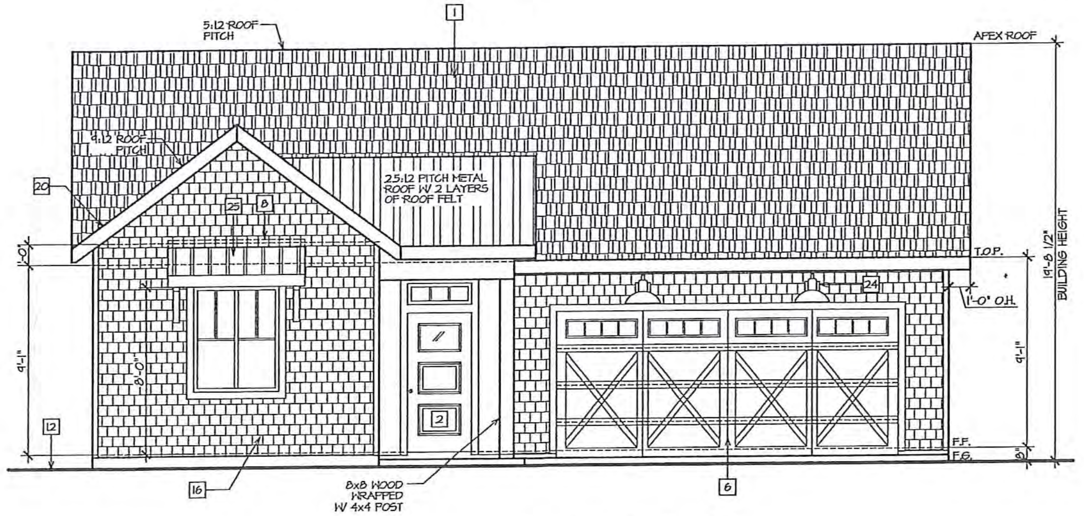
NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



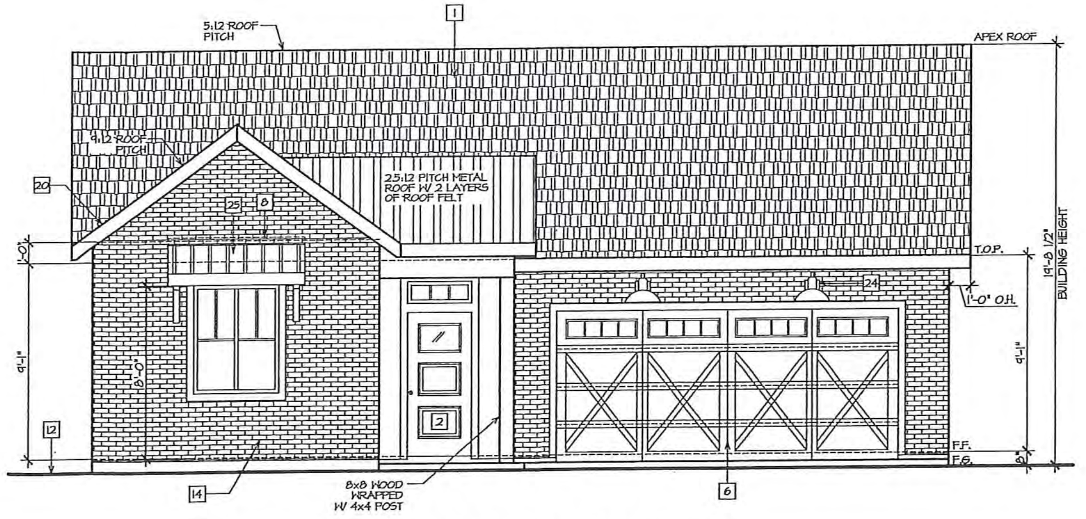
FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"



FRONT ELEV.- C

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
Plans Approved Under the 2016 California Building Codes
16SPN
OCT 28 2019
Subject To Field Approval, Laws, Codes, and Ordinances
Approved With Noted Corrections

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REV.	DATE	DESCRIPTION OF WORK
1		
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3		
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5		

CLOVIS
PLAN 7512 (OLIVE)

DATE
APRIL 5, 2019

PROJECT
CLEMENTINE SERIES

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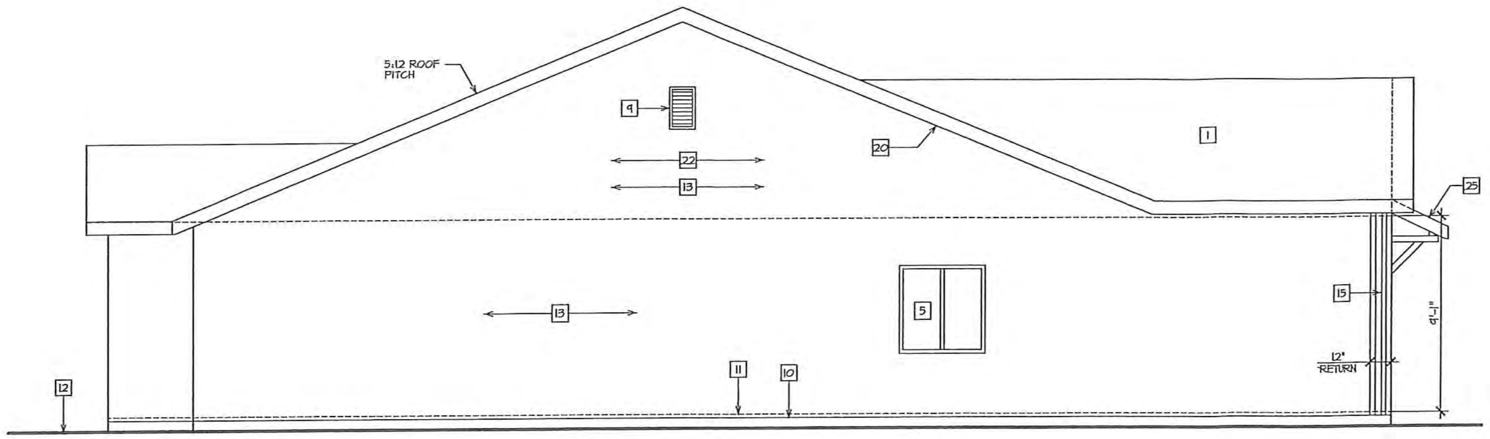
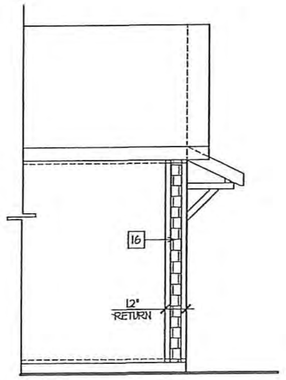
SHEET NO.
A-2
OF SHEETS



LEFT ELEV.- A

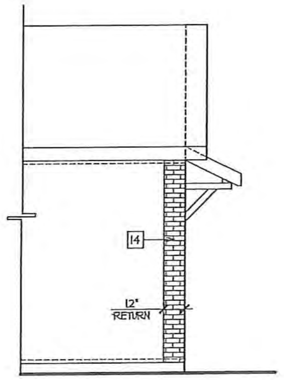
SCALE: 1/4" = 1'-0"



PARTIAL

LEFT ELEV.- B

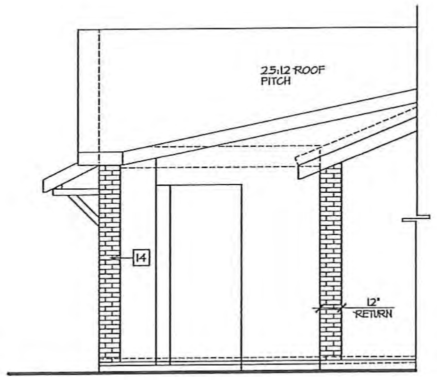
SCALE: 1/4" = 1'-0"



PARTIAL

LEFT ELEV.- C

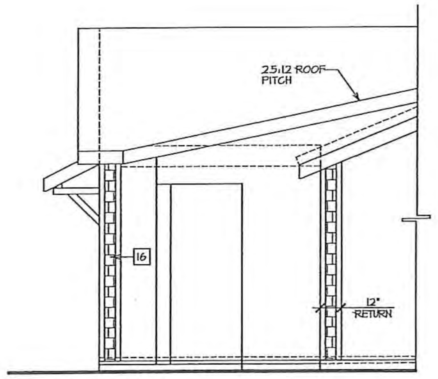
SCALE: 1/4" = 1'-0"



PARTIAL

RIGHT ELEV.- C

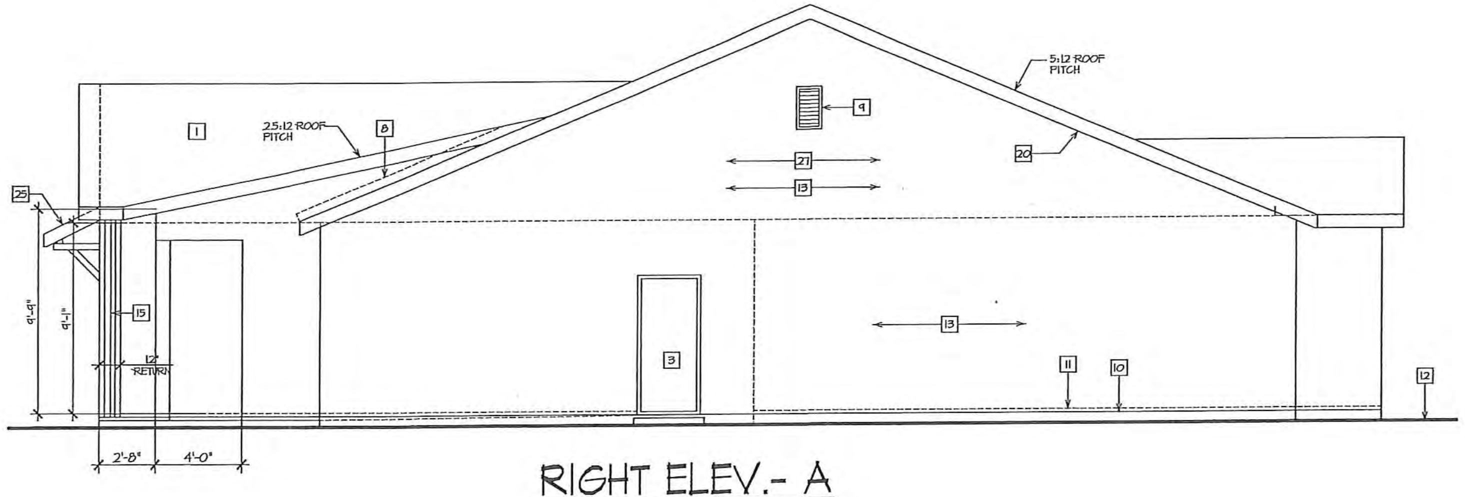
SCALE: 1/4" = 1'-0"



PARTIAL

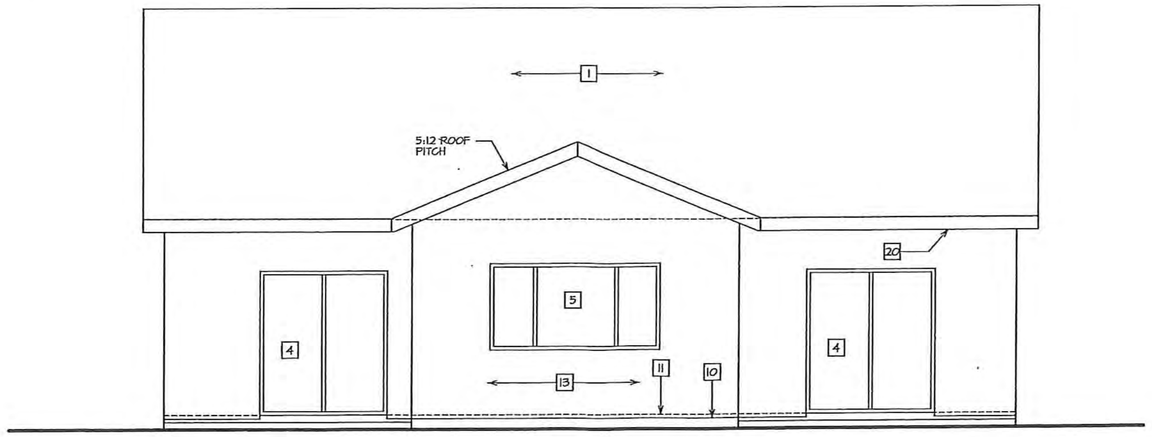
RIGHT ELEV.- B

SCALE: 1/4" = 1'-0"



RIGHT ELEV.- A

SCALE: 1/4" = 1'-0"



TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"

☐	**ELEVATION KEYNOTES**
	SEE ELEVATION KEYNOTES ON SHEET A-2

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1310) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

16SPN
OCT 2 8 2019

REV.	DATE	DESCRIPTION OF WORK
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CLOVIS
PLAN 7512 (OLIVE)

DATE	PROJECT
APRIL 5, 2019	CLEMENTINE SERIES

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SHEET NO.
A-2.1
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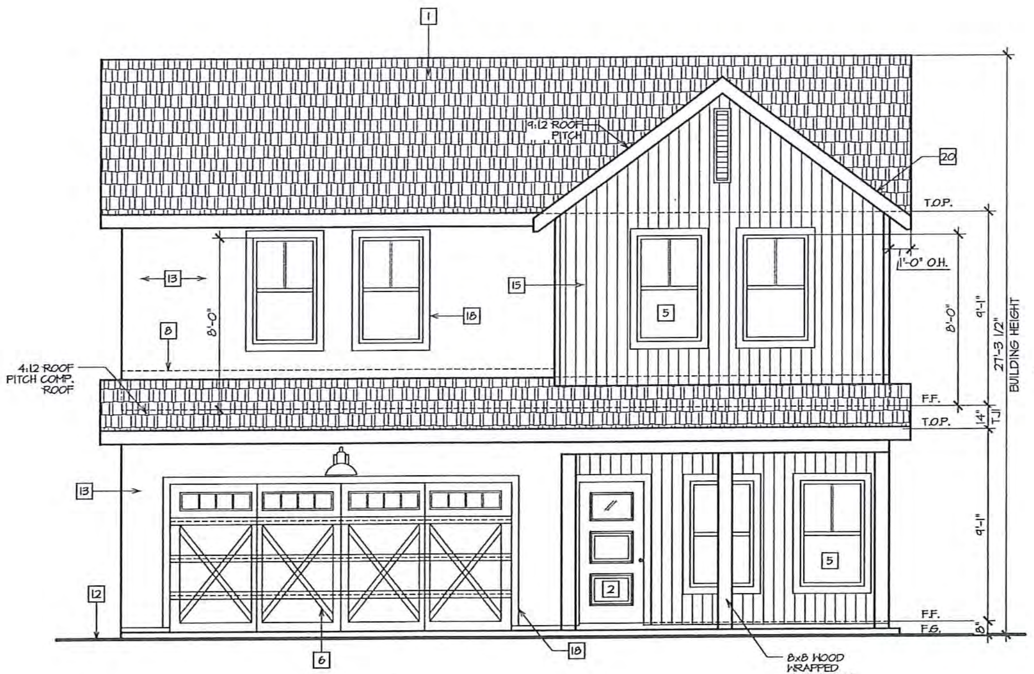
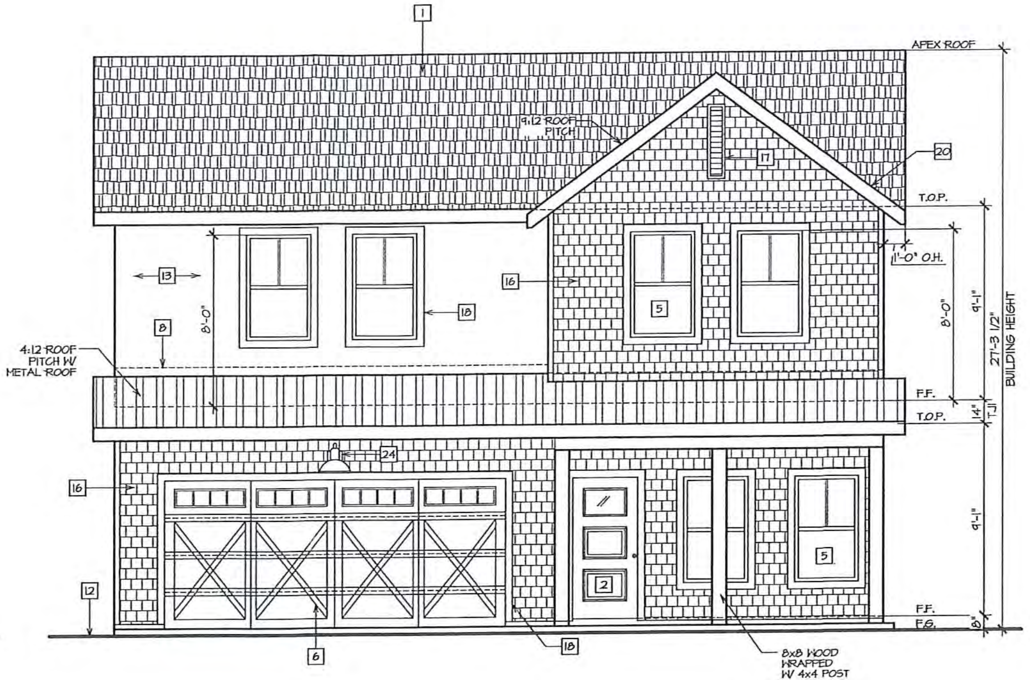


FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



FRONT ELEV.- B

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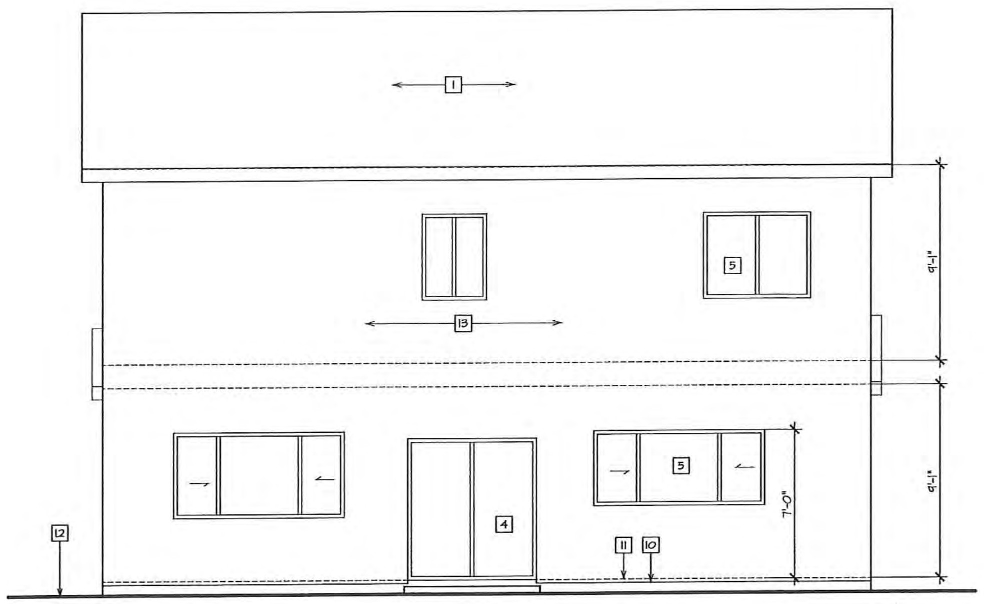
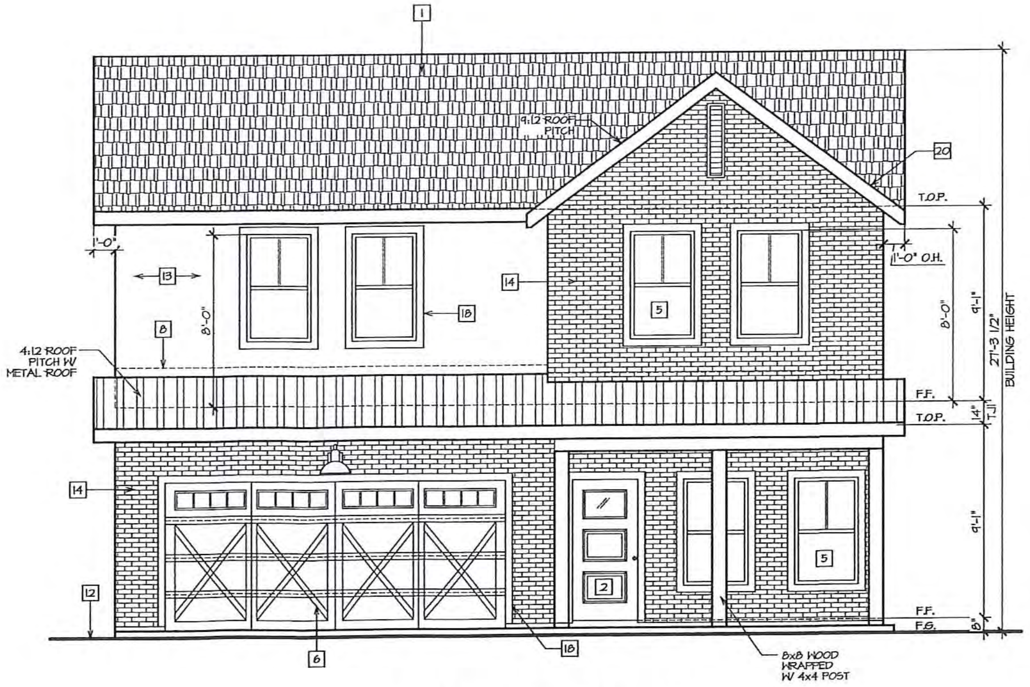


TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"



FRONT ELEV.- C

SCALE: 1/4" = 1'-0"

☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT O/ ROOF SHEATHING OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R4052.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-40533)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH W/ 6 FEET MIN. MOUNTING HT.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-5.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 6" SLOPE AWAY FOR 10' FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (1" FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	CULTURED STONE/BRICK MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL VERTICAL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	HARDIE SHINGLE SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-2290) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
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NOTE FOR RADIANT BARRIER:

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NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

City of Clovis - Planning and Development Services Division-
Plans Approved Under the 2016 California Building Codes
16SPN
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Subject To Field Approval,
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Approved With Noted Corrections

REV.	DATE	DESCRIPTION OF WORK
1		
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CLOVIS
PLAN 7514 (DEWBERRY)

DATE	PROJECT
APRIL 5, 2019	CLEMENTINE SERIES

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SHEET NO.
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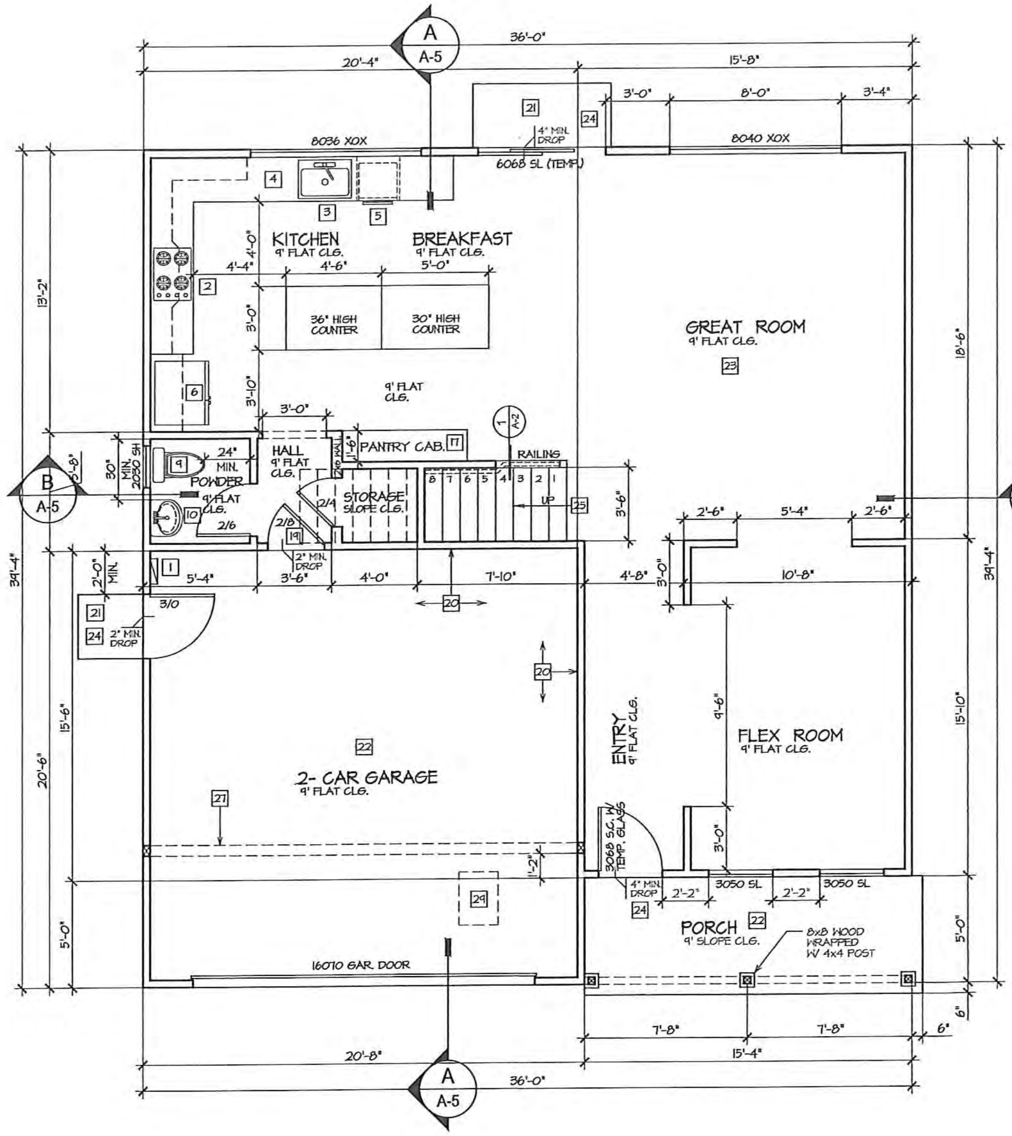
OF SHEETS



FIRST FLOOR PLAN 920 SQ. FT.

SCALE: 1/4" = 1'-0"

FIRST FLOOR ------- 920 SQ. FT.
SECOND FLOOR ---- 1,166 SQ. FT.
RESIDENCE ---------- 2,086 SQ. FT.
2-CAR GARAGE ----- 418 SQ. FT.
COVERED PORCH ---- 77 SQ. FT.
PATIO ----------------- 0 SQ. FT.

Residential Site Plan Review Number 17-20

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	DRYER SPACE- PROVIDE BACKDRAFT DAMPER AT DRYER VENT TERMINATION. DRYER VENT SHALL EXHAUST MIN. 4"Φ DUCT DIRECTLY TO THE EXTERIOR.
8	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
9	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
10	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
11	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
12	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
14	HOSE BIB- PROVIDE NON REMOVABLE BACK FLOW PREVENTERS. REFER TO PLUMBING PLAN FOR EXACT LOCATION.
15	LINEN W/ 5 STACK SHELVES (12" MIN.)
16	CLOTHES CLOSET WITH SHELF AND POLE
17	PANTRY WITH 5 STACK SHELVES (16" MIN.)
18	30"x30" ATTIC ACCESS WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. ALL ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS.
19	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
20	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED. (MAY USED 1/2" MIN. GYP. BD. AT ALL LOCATIONS THAT IS NOT BETWEEN THE RESIDENCE AND GARAGE)
21	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
22	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
23	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN
24	LANDINGS MAY NOT BE LOWER THAN 1.5" MEASURED FROM TOP OF THRESHOLD FOR OUT-SWINGING DOORS. LANDINGS MAY NOT BE LOWER THAN 7.75" MEASURED FROM TOP OF THRESHOLD FOR IN-SWINGING DOORS AND SLIDING DOORS. <u>EXCEPTION</u>: STORM AND SCREEN DOORS ARE PERMITTED TO SWING OVER ALL EXTERIOR STAIRS AND LANDINGS.
25	STAIR- MIN. 10" TREAD AND 7 3/4" MAX. RISER WITH MIN. 36" CLEAR WIDTH PER DET. 1/A-2
26	WOOD FLOOR SLAB- 3/4" THICK PLYWOOD SHEATHING OVER FLOOR JOIST
27	BEAM/ HEADER OUTLINE- REFER TO FLOOR/ ROOF FRAMING PLAN
28	DUCT CHASE- REFER TO MECHANICAL PLAN
29	22"x30" BI SERIES FIRE RATED ATTIC ACCESS DOOR W/ SELF CLOSER AND SELF LATCHING BY BABCOCK-DAVIS (WARNOCK-HERSEY LISTED 3 HOURS FIRE RATING IN HORIZONTAL SURFACES) OR ANY APPROVED EQUAL.

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 OF GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality insulation installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- — None —

REQUIRED SPECIAL FEATURES
- PV System: 2.0 kWdc

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSAB125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NO TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.21	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR	0.30	0.23

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL (2x4)	R-13 W/ NO FOAM
GARAGE INT. WALL (2x6)	R-19 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY/KNEE WALL	R-19
ROOF w/ Radiant Barrier	R-38
ROOF @ FAU w/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 E.F.
REFER TO CFIR FOR MORE DETAILS AND INFORMATION	

City of Clovis - Planning and Development Services
Plans Approved Under the 2016 California Building Codes
16SPN
OCT 28 2019
Subject To Field Approval, Laws, Codes, and Ordinances
Approved With Noted Corrections

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
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CLOVIS
PLAN 7514 (DEWBERRY)

DATE	PROJECT
APRIL 5, 2019	CLEMENTINE SERIES

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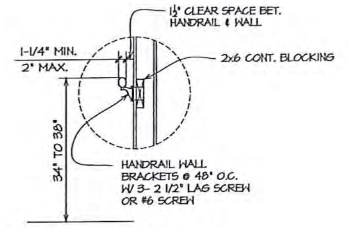
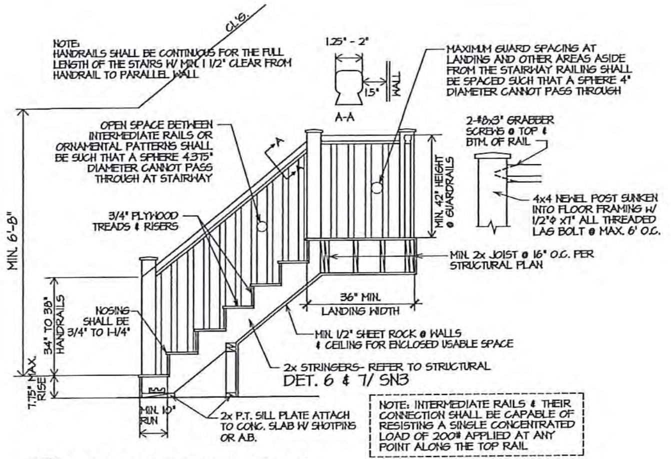
SHEET NO.
A-1
OF SHEETS

☐	FLOOR PLAN KEY NOTES:
	SEE FLOOR PLAN KEYNOTES ON SHEET A-1



WALL MOUNT HANDRAIL



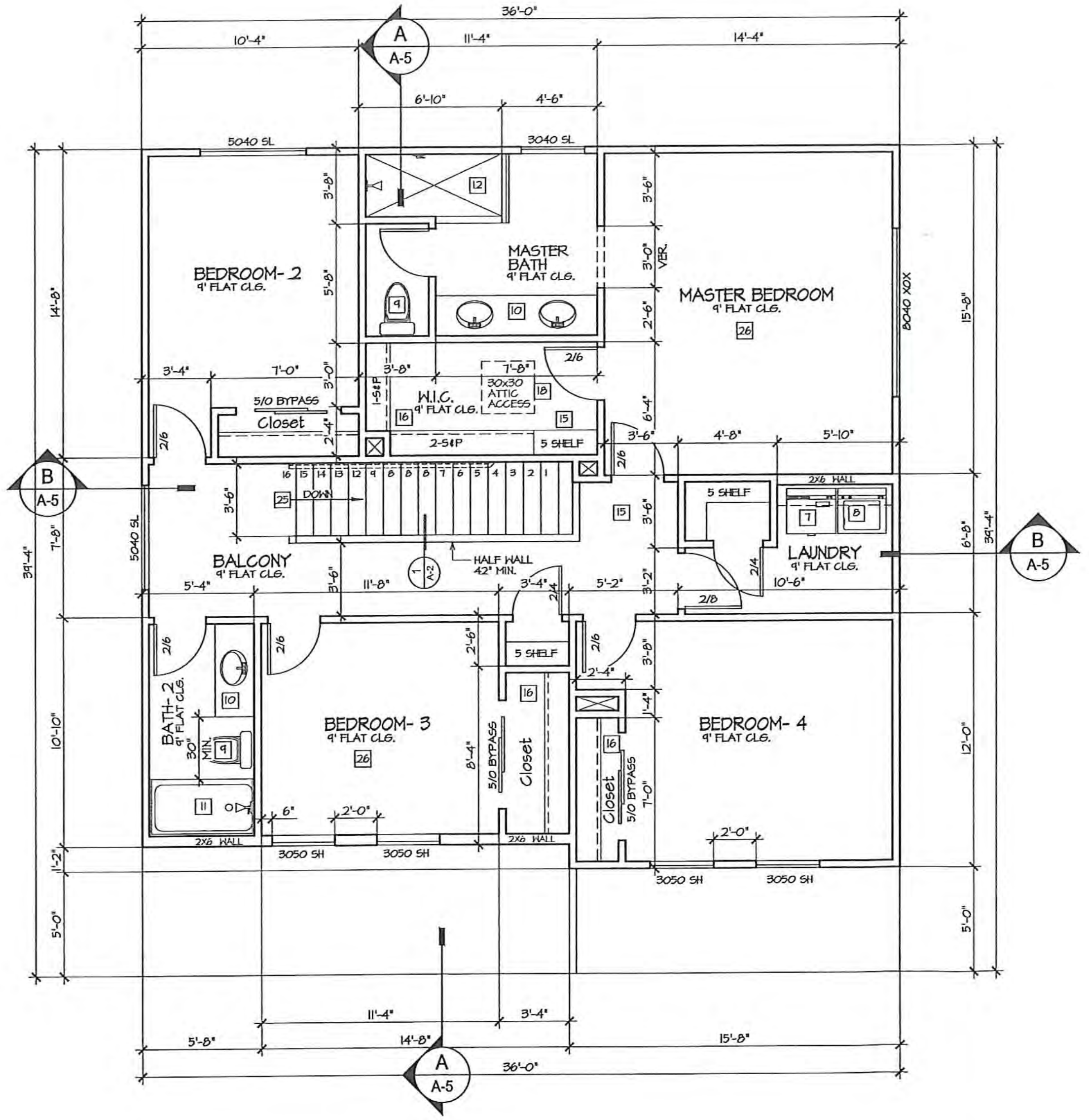
NOTE: INTERMEDIATE RAILS & THEIR CONNECTION SHALL BE CAPABLE OF RESISTING A SINGLE CONCENTRATED LOAD OF 200# APPLIED AT ANY POINT ALONG THE TOP RAIL

1 A-2 TYP. STAIR DETAIL

MIN. STAIR WIDTH SHALL BE 36". ALL TREADS AND RISERS SHALL HAVE MAX. 3/8" VARIANCE FROM THE LEAST TO THE GREATEST.
STAIR TREADS SHALL HAVE A RUN OF AT LEAST 10".
A NOSING IS NOT REQUIRED WHERE THE TREAD DEPTH IS A MINIMUM OF 11 INCHES.

NOTE:
A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE LARGER THAN 12'-3" BETWEEN FLOOR LEVELS OR LANDINGS PER R311.7.3

NOTE:
COMPLY WITH THE REQUIREMENTS FOR WINDOW FALL PROTECTION WHERE THE OPENING OF AN OPERABLE WINDOW IS LOCATED MORE THAN 72 INCHES ABOVE THE FINISHED GRADE OR SURFACE BELOW, THE LOWEST PART OF THE OPENING OF THE WINDOW SHALL BE A MINIMUM OF 24 INCHES ABOVE THE FINISHED FLOOR OF THE ROOM IN WHICH THE WINDOW IS LOCATED.



SECOND FLOOR PLAN 1,166 SQ. FT.

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
16SPN
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CLOVIS
PLAN 7514 (DEWBERRY)

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APRIL 5, 2019	CLEMENTINE SERIES

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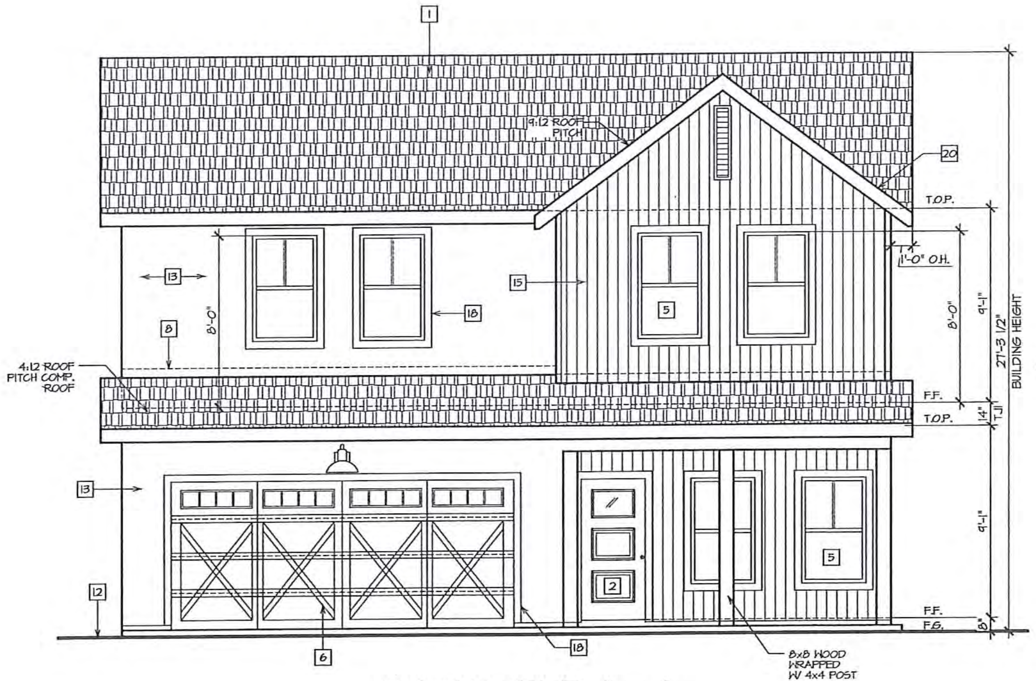
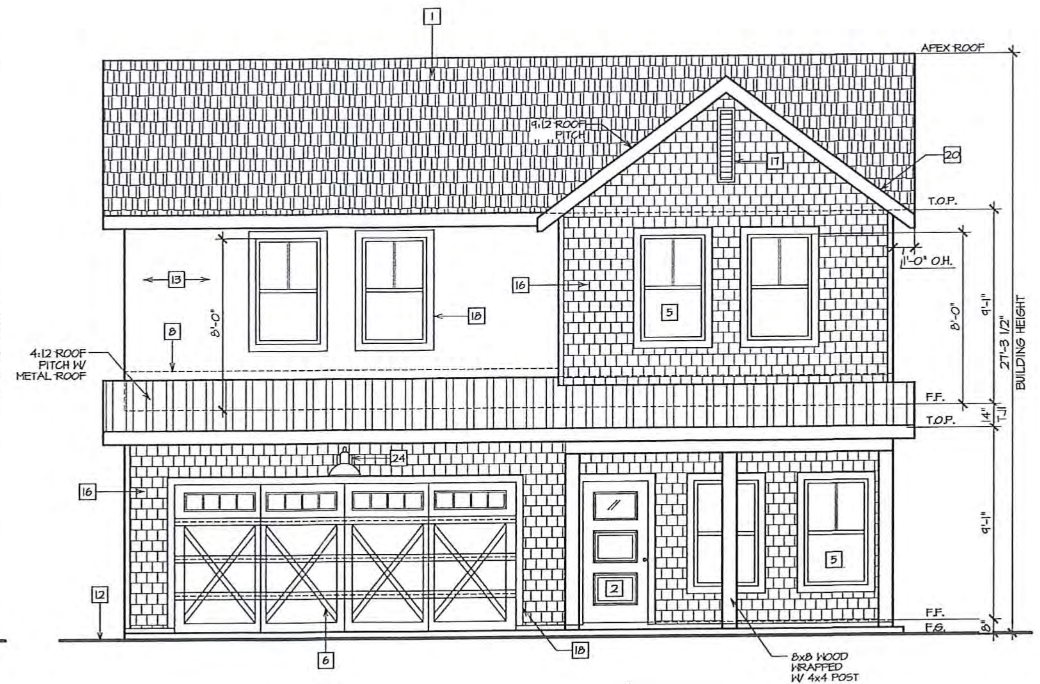
SHEET NO.
A-2
OF SHEETS



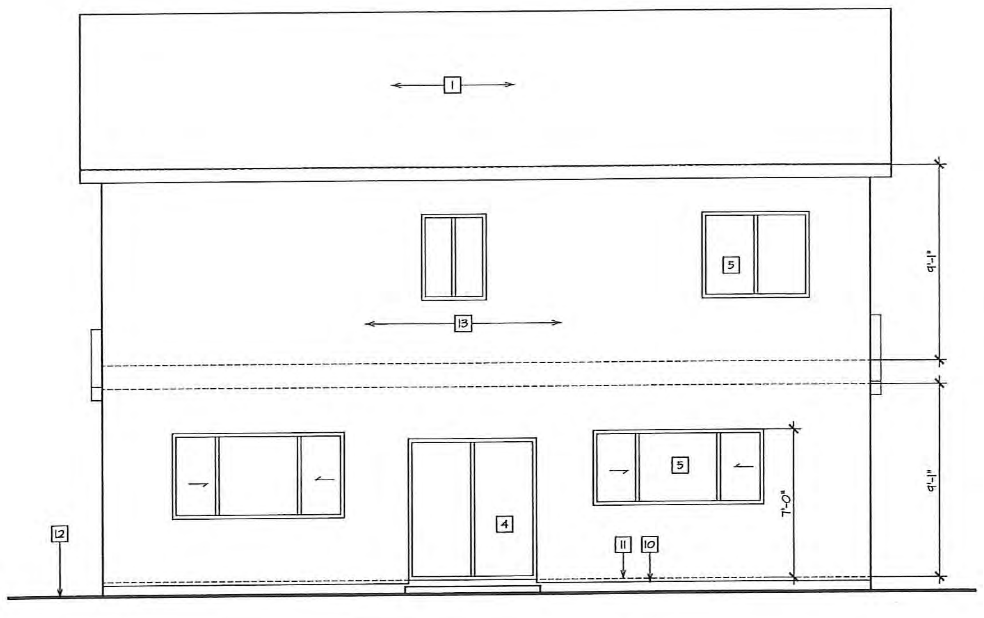
FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



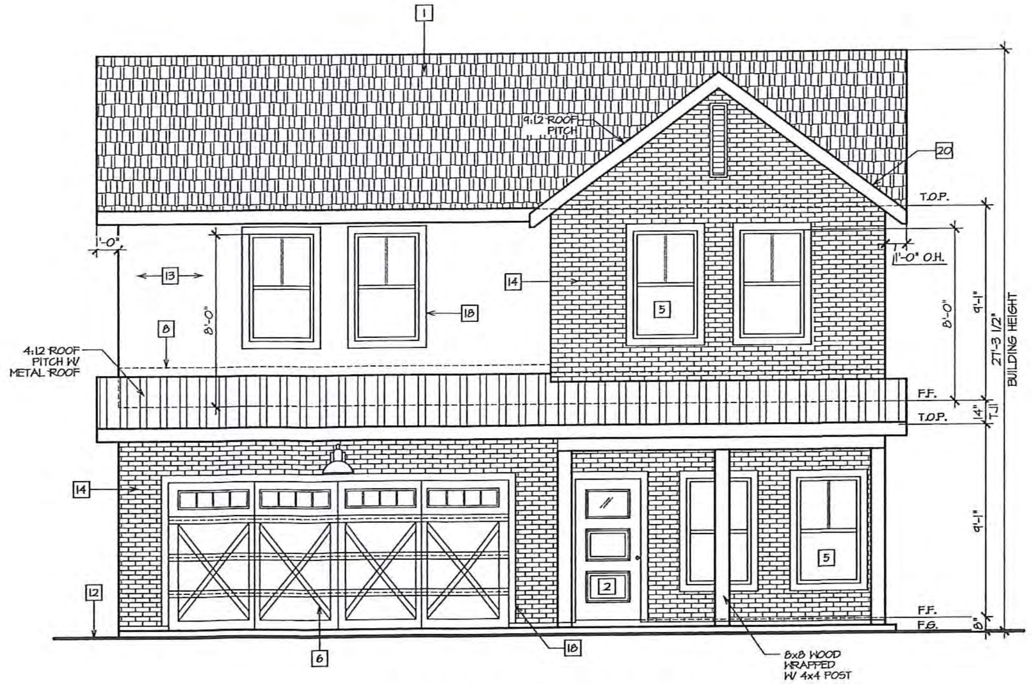
FRONT ELEV.- B

SCALE: 1/4" = 1'-0"



TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"



FRONT ELEV.- C

SCALE: 1/4" = 1'-0"

☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT O/ ROOF SHEATHING OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-4053.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH W/ 6 FEET MIN. MOUNTING HT.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-5.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 6" SLOPE AWAY FOR 10' FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (1" FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	CULTURED STONE/BRICK MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL VERTICAL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	HARDIE SHINGLE SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-2290) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE BERMUDA SHUTTER PER ELEVATION. INSTALL PER MANUFACTURER INSTALLATION INSTRUCTIONS.
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES W/ DRIP EDGE FLASHING.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 6x6 POST WITH STUCCO FINISH
24	APPROVED WEATHER PROOF EXTERIOR WALL LIGHT

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

City of Clovis - Planning and Development Services
16SPN
OCT 28 2019
Subject To Field Approval, Laws, Codes, and Ordinances
Approved With Noted Corrections

REV.	DATE	DESCRIPTION OF WORK
1		
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CLOVIS
PLAN 7514 (DEWBERRY)

DATE	PROJECT
APRIL 5, 2019	CLEMENTINE SERIES

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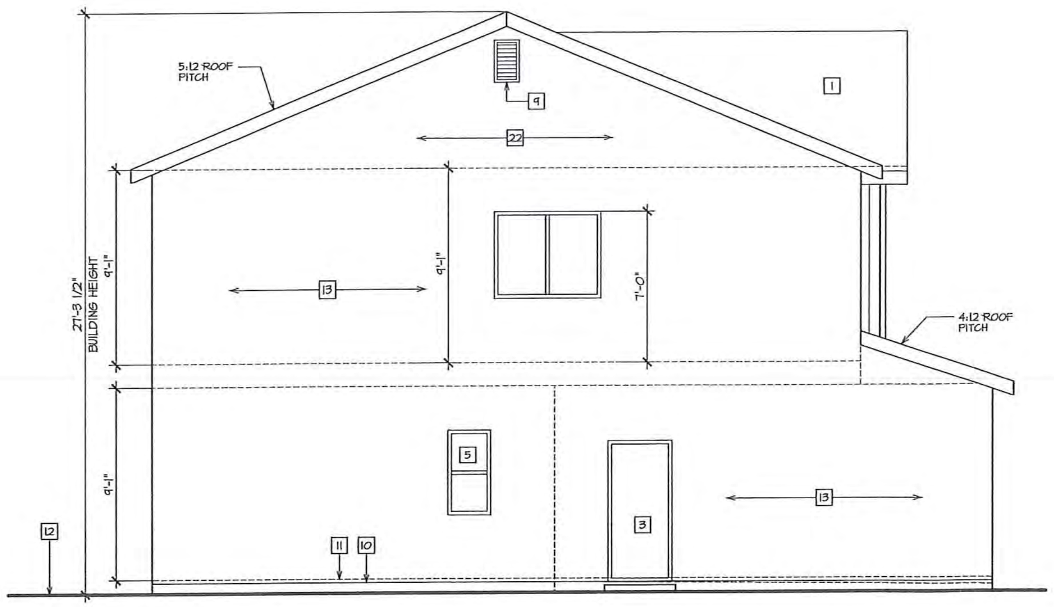
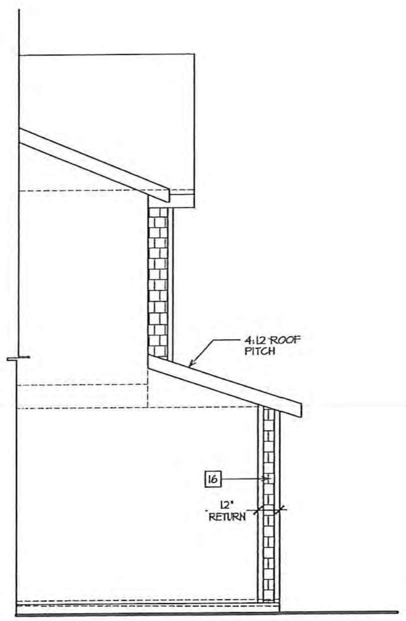
SHEET NO.
A-3
OF SHEETS



LEFT ELEV.- A

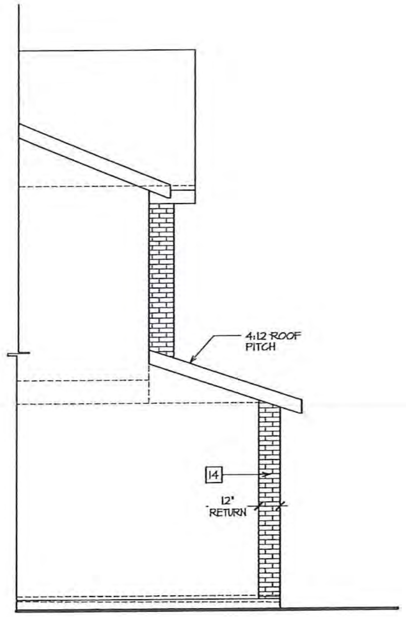
SCALE: 1/4" = 1'-0"



PARTIAL

LEFT ELEV.- B

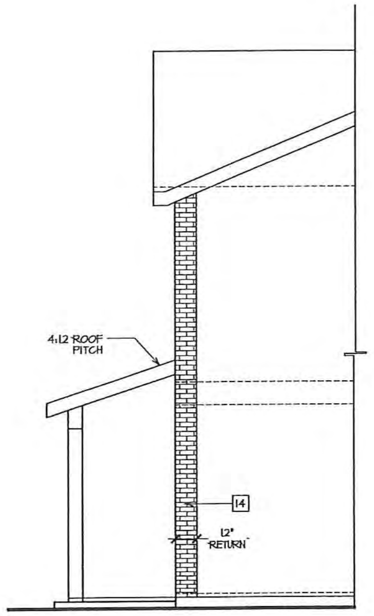
SCALE: 1/4" = 1'-0"



PARTIAL

LEFT ELEV.- C

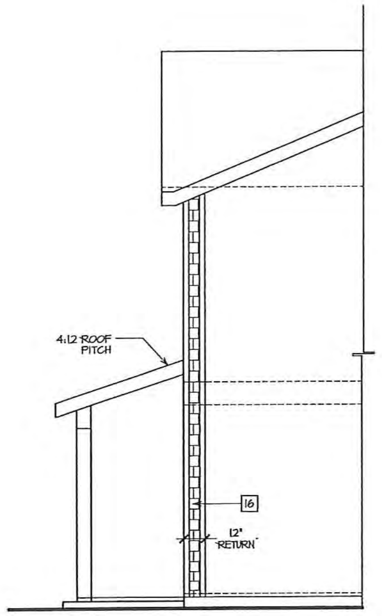
SCALE: 1/4" = 1'-0"



PARTIAL

RIGHT ELEV.- C

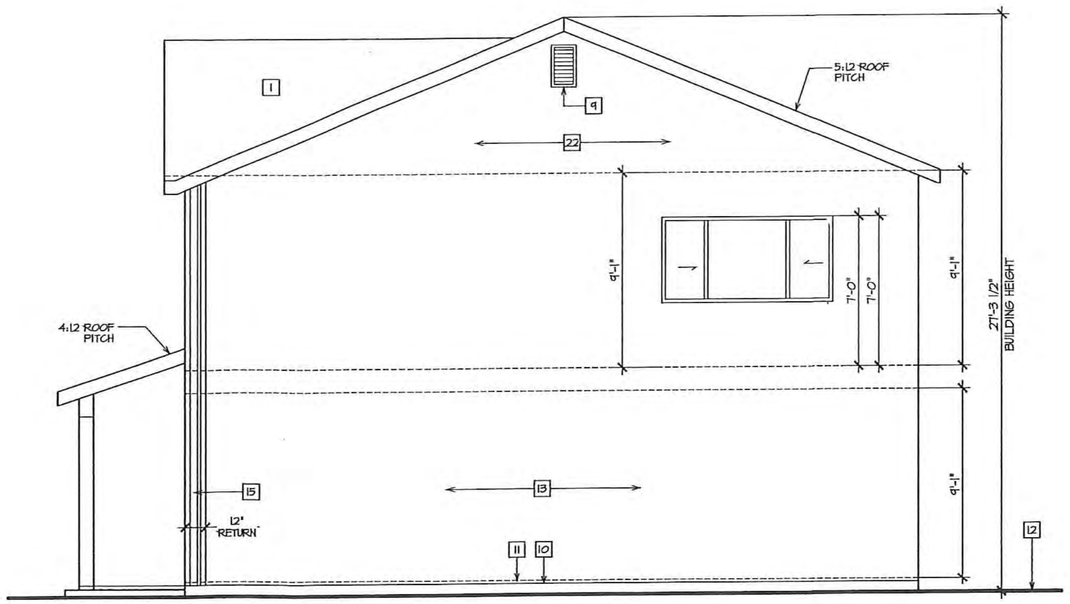
SCALE: 1/4" = 1'-0"



PARTIAL

RIGHT ELEV.- B

SCALE: 1/4" = 1'-0"



RIGHT ELEV.- A

SCALE: 1/4" = 1'-0"

☐	**ELEVATION KEYNOTES**
	SEE ELEVATION KEYNOTES ON SHEET A-2

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

REV.	DATE	DESCRIPTION OF WORK
1		
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CLOVIS

PLAN 7514 (DEWBERRY)

DATE	PROJECT
APRIL 5, 2019	CLEMENTINE SERIES

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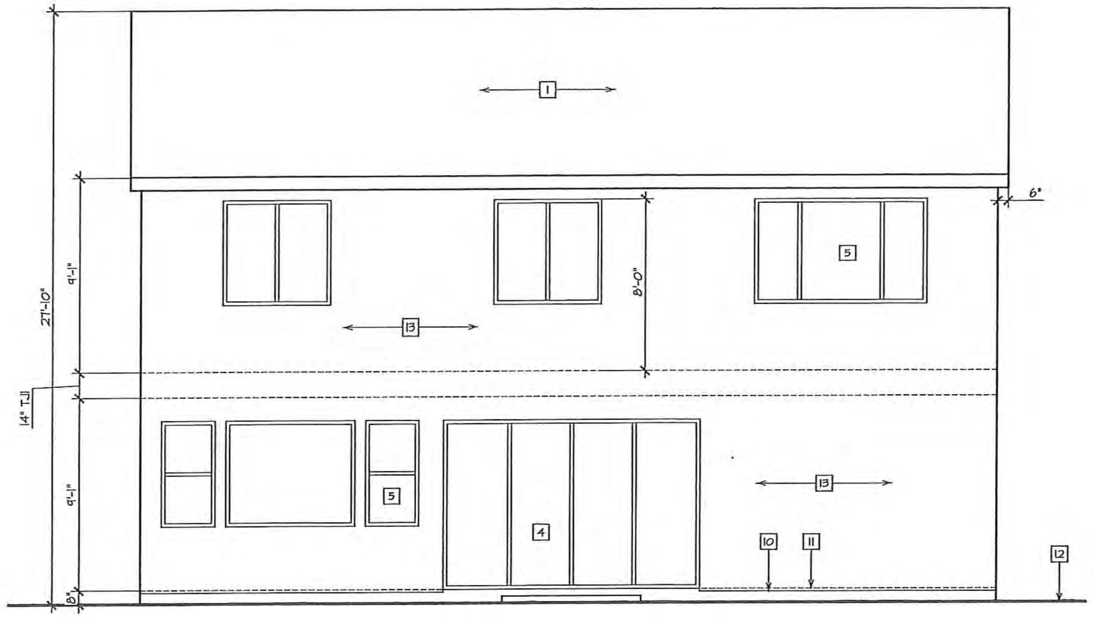
SHEET NO.

A-3.1

OF SHEETS



TYP. RIGHT ELEV.

SCALE: 3/16" = 1'-0"

ELEVATION KEYNOTES

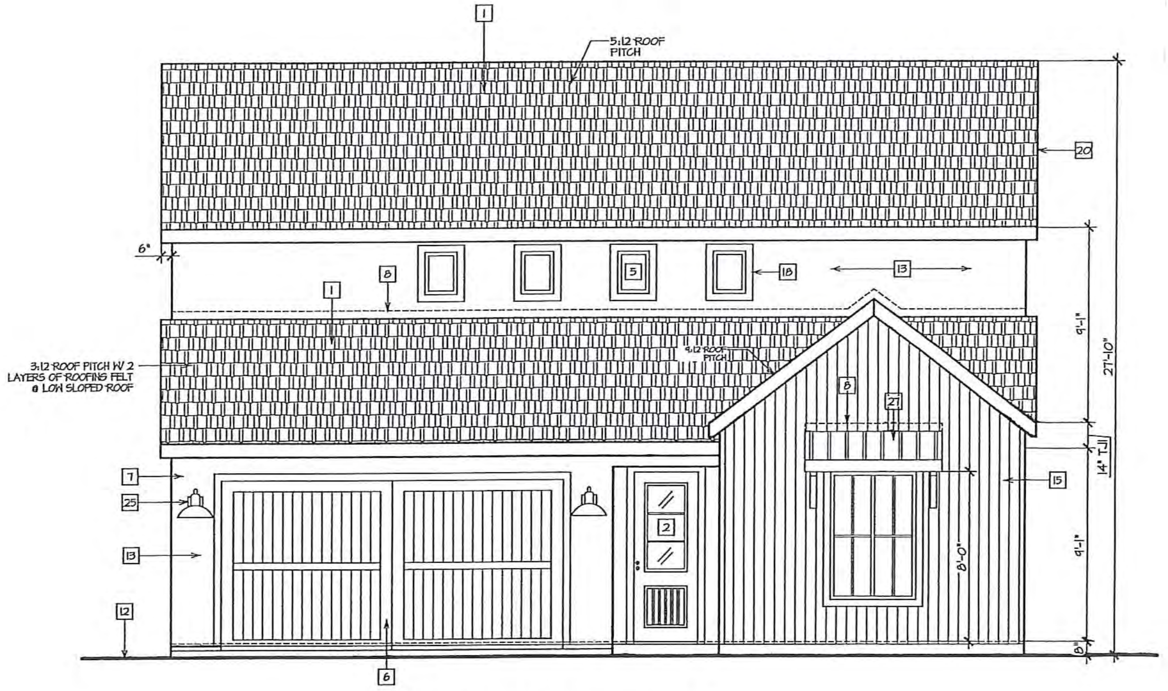
☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT O/ ROOF SHEATHING. (ROOF REMITTANCE IS 0.85) (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-4.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 4x4 POST WITH STUCCO FINISH
24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT
26	PROVIDE WALL STRAP TO TIE DISCONTINUOUS TOP PLATE CS16 STRAP. 48" LONG W/ 2x BLOCKING
27	METAL SHED ROOF O/ ROOF SHEATHING W/ 2x4 DF #2 RAFTERS AT 24" O.C. O/ BUILT UP 4x BRACKET W/ 4x6 DF #2 HEADER PER DETAIL 11/SD3 ON STRUCTURAL PLAN.

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

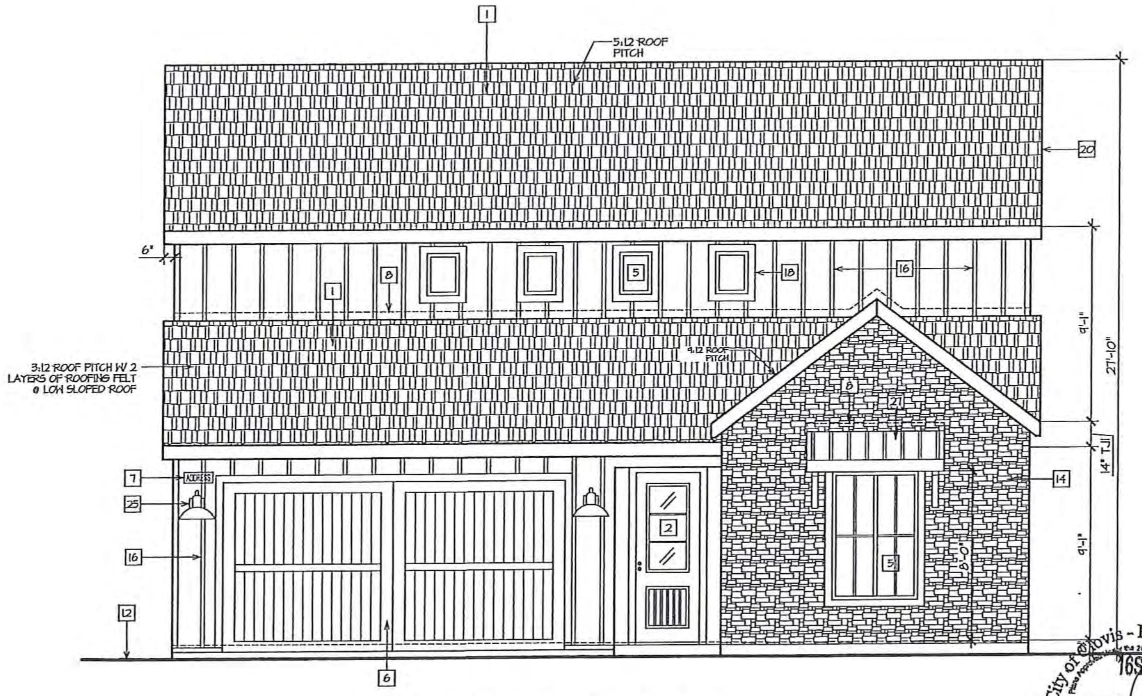
NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"

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REV.	DATE	DESCRIPTION OF WORK
1		
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CLOVIS
PLAN 4027 (RHAPSODY)

DATE	PROJECT
JAN. 17, 2019	CORONET SERIES

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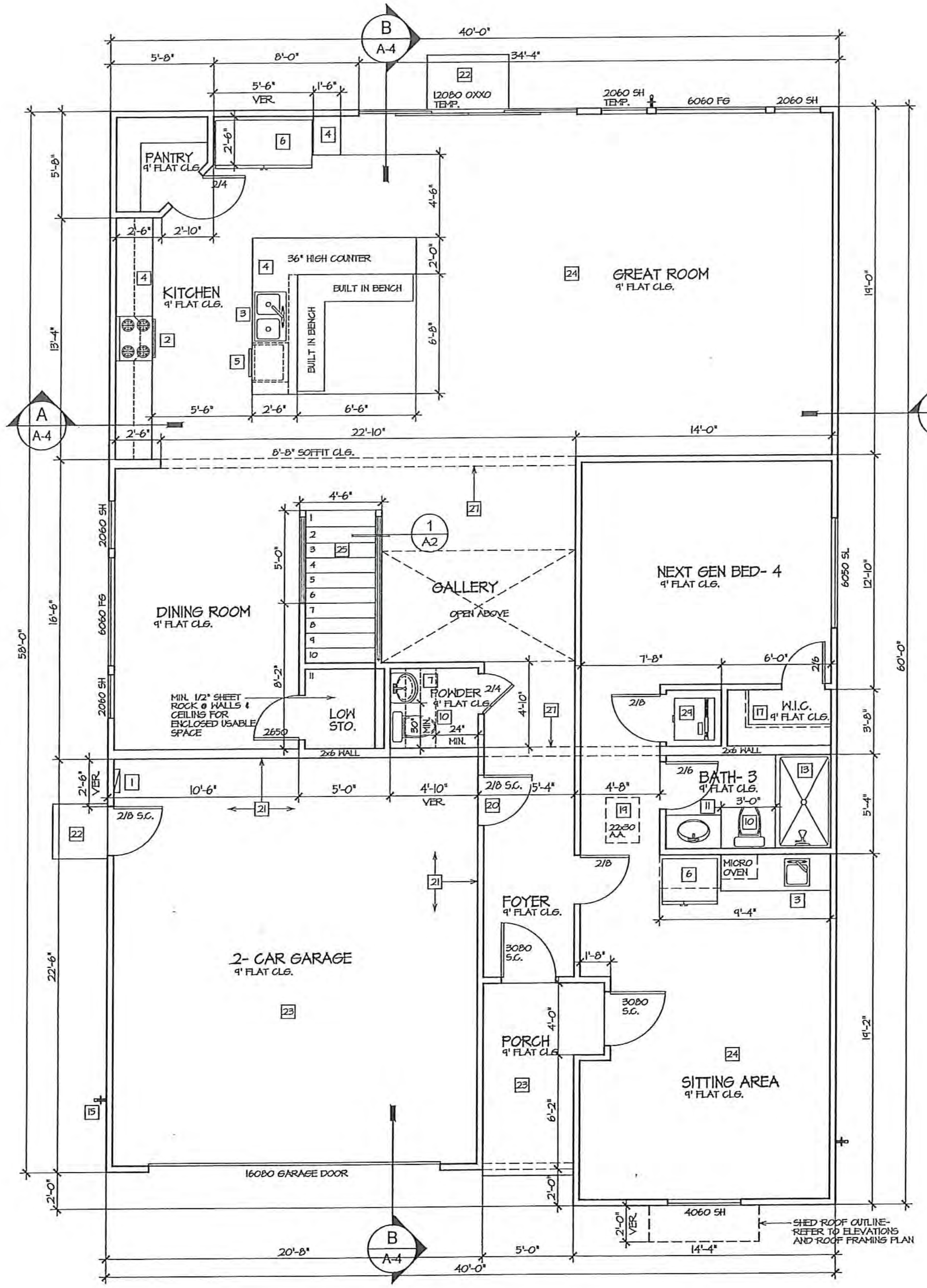

FIRST FLOOR PLAN 1830 SQ. FT.

SCALE: 1/4" = 1'-0"

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI (RUC80IN) OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	WALL TYPE LAVATORY WITH PEDESTAL. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
8	DRYER SPACE- PROVIDE BACKDRAFT DAMPER @ VENT TERMINATION
9	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
10	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
11	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
12	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
14	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
15	HOSE BIB- PROVIDE NON REMOVABLE BACK FLOW PREVENTERS
16	LINEN CLOSET W/ 5 STACK SHELVES (12" MIN.)
17	CLOTHES CLOSET WITH SHELF AND POLE
18	PANTRY WITH 5 STACK SHELVES (16" MIN.)
19	22"x30" MIN. ATTIC ACCESS & 30"x30" FOR FURNACE WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. THE ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS.
20	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
21	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED.
22	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
23	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
24	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN
25	STAIR- MIN. 10" TREAD AND 7 3/4" MAX. RISER WITH 36" CLEAR WIDTH PER DET. 1/A-2
26	WOOD FLOOR - 3/4" THICK PLYWOOD SHEATHING OVER FLOOR JOIST
27	BEAM/ HEADER OUTLINE- REFER TO FLOOR/ ROOF FRAMING PLAN
28	DUCT CHASE- REFER TO MECHANICAL PLAN
29	STACKABLE WASHER AND DRYER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 FOR GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality insulation installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- — None —

REQUIRED SPECIAL FEATURES
- PV System: 2.2 kWdc

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL.
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSAB125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION		
GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.27	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR		

BUILDING INSULATION	
SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL	R-13 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY WALL	R-19
ROOF W/ Radiant Barrier	R-38
ROOF @ FAU W/ Radiant Barrier	R-30
ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING	
COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 EF.
REFER TO CFIR FOR MORE DETAILS AND INFORMATION	

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CLOVIS
PLAN 4027 (RHAPSODY)

DATE: JAN. 17, 2019
PROJECT: CORONET SERIES

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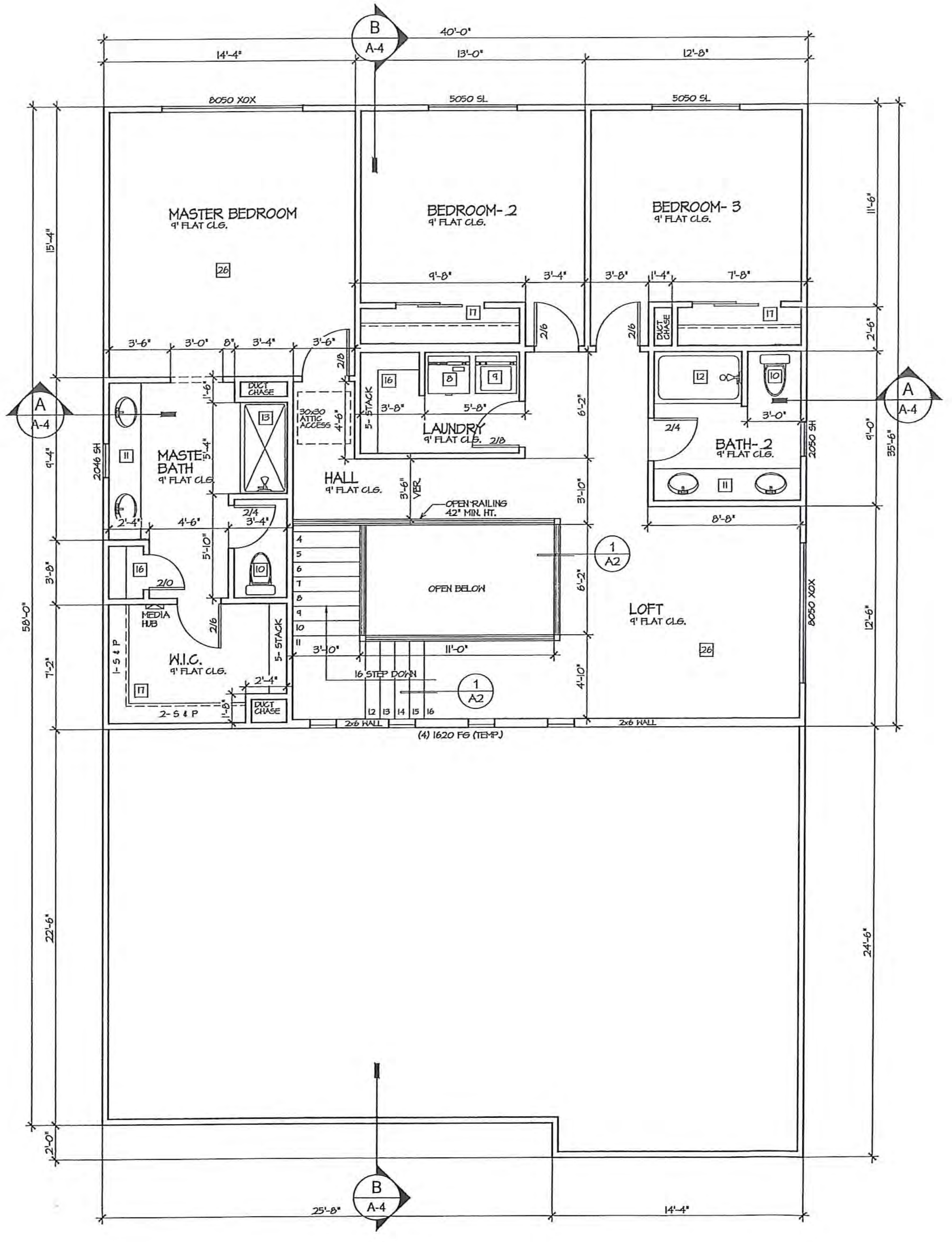
SHEET NO.
A-1
OF SHEETS

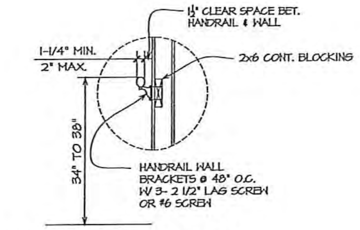


SECOND FLOOR PLAN 1,298 SQ. FT.

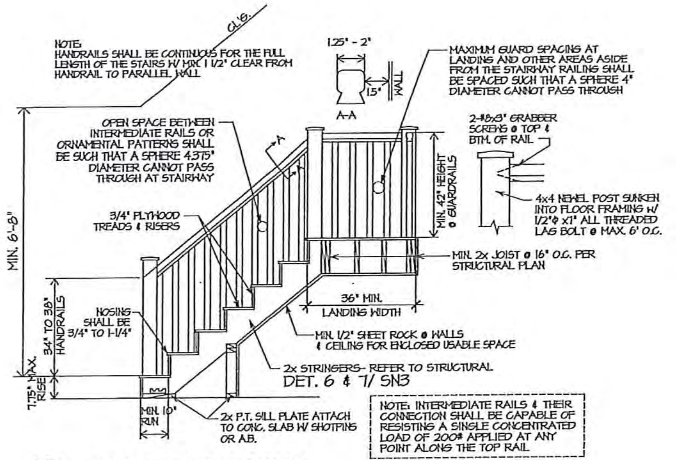
SCALE: 1/4" = 1'-0"

☐ FLOOR PLAN KEY NOTES:

SEE FLOOR PLAN KEYNOTES ON SHEET A-1



WALL MOUNT HANDRAIL



NOTE:
HANDRAILS SHALL BE CONTINUOUS FOR THE FULL LENGTH OF THE STAIRS W/ MIN. 1 1/2" CLEAR FROM HANDRAIL TO PARALLEL WALL

NOTE: INTERMEDIATE RAILS & THEIR CONNECTION SHALL BE CAPABLE OF RESISTING A SINGLE CONCENTRATED LOAD OF 200# APPLIED AT ANY POINT ALONG THE TOP RAIL

1
A-2

TYP. STAIR DETAIL

MIN. STAIR WIDTH SHALL BE 36". ALL TREADS AND RISERS SHALL HAVE MAX 3/8" VARIANCE FROM THE LEAST TO THE GREATEST.
STAIR TREADS SHALL HAVE A RUN OF AT LEAST 10".
A NOSING IS NOT REQUIRED WHERE THE TREAD DEPTH IS A MINIMUM OF 11 INCHES.

NOTE:
A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE LARGER THAN 12'-3" BETWEEN FLOOR LEVELS OR LANDINGS PER R311.7.3

NOTE:
COMPLY WITH THE REQUIREMENTS FOR WINDOW FALL PROTECTION WHERE THE OPENING OF AN OPERABLE WINDOW IS LOCATED MORE THAN 72 INCHES ABOVE THE FINISHED GRADE OR SURFACE BELOW, THE LOWEST PART OF THE OPENING OF THE WINDOW SHALL BE A MINIMUM OF 24 INCHES ABOVE THE FINISHED FLOOR OF THE ROOM IN WHICH THE WINDOW IS LOCATED.

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SHEET NO.
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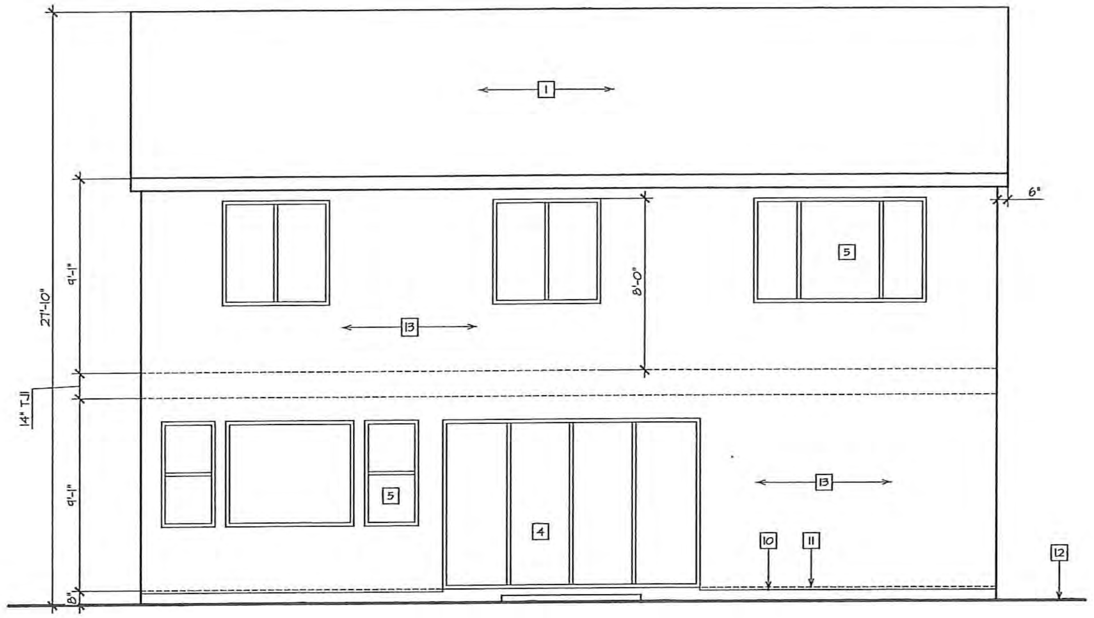
ELEVATION KEYNOTES

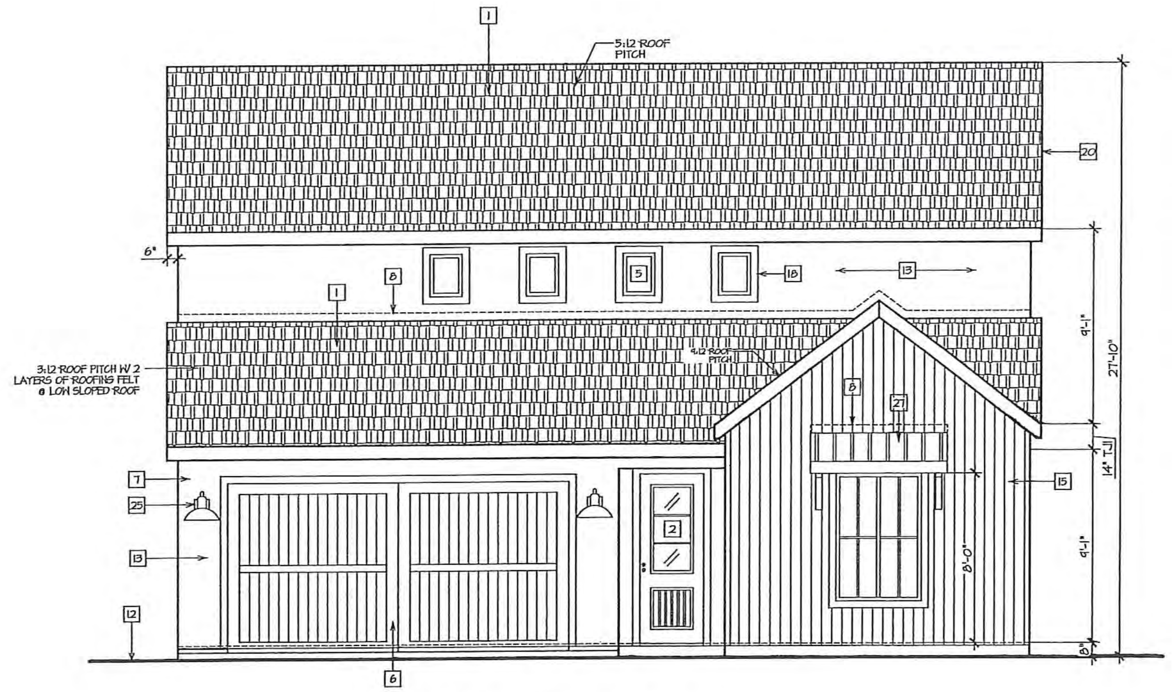
☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT O/ ROOF SHEATHING. (ROOF REMITTANCE IS 0.85) (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-405.3.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-4.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 4x4 POST WITH STUCCO FINISH
24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT
26	PROVIDE WALL STRAP TO TIE DISCONTINUOUS TOP PLATE CS16 STRAP. 48" LONG W/ 2x BLOCKING
27	METAL SHED ROOF O/ ROOF SHEATHING W/ 2x4 DF #2 RAFTERS AT 24" O.C. O/ BUILT UP 4x BRACKET W/ 4x6 DF #2 HEADER PER DETAIL 11/SD3 ON STRUCTURAL PLAN.

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL.
NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



TYP. RIGHT ELEV.

SCALE: 3/16" = 1'-0"



FRONT ELEV.- A

SCALE: 1/4" = 1'-0"

FRONT ELEV.- B

SCALE: 1/4" = 1'-0"

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CLOVIS
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☐	ELEVATION KEYNOTES
	SEE ELEVATION KEYNOTES ON SHEET A-3

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL
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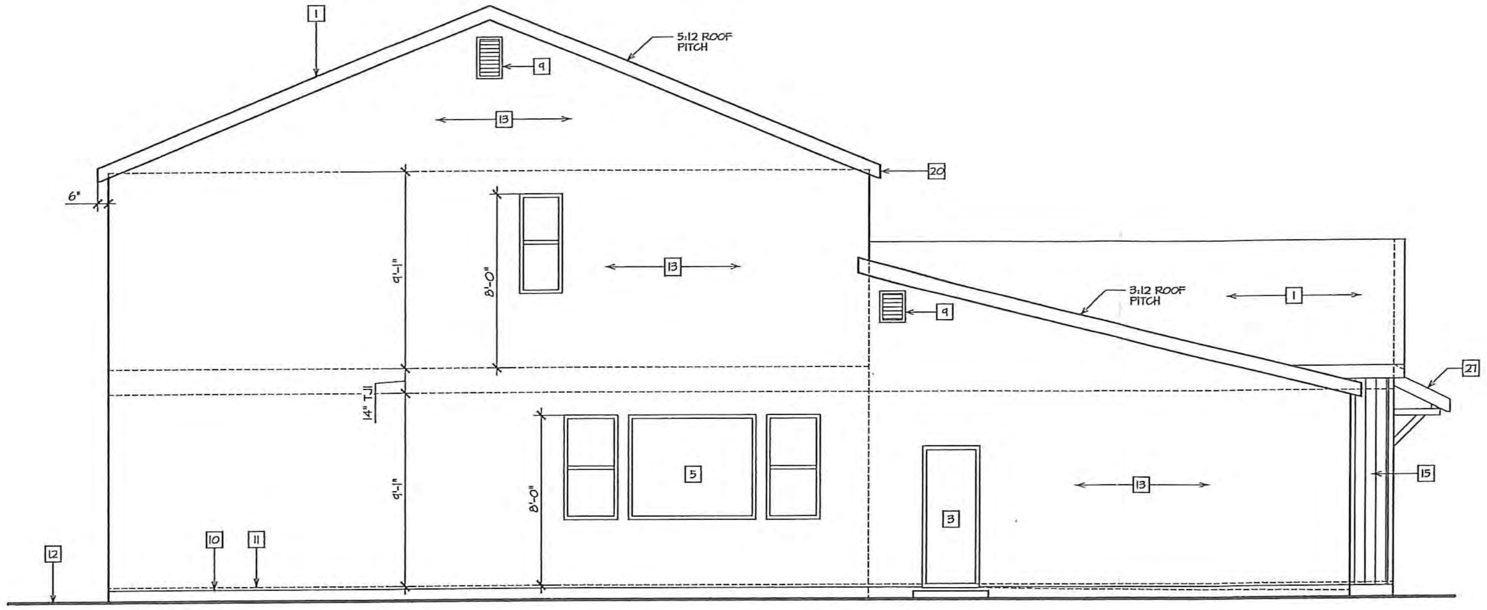
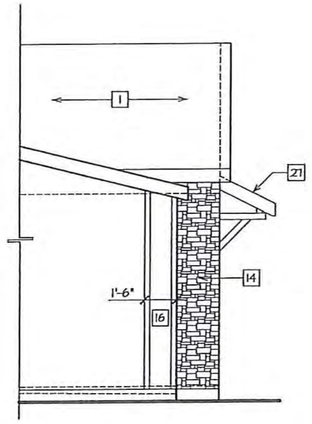
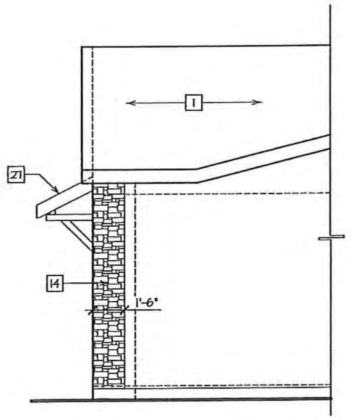


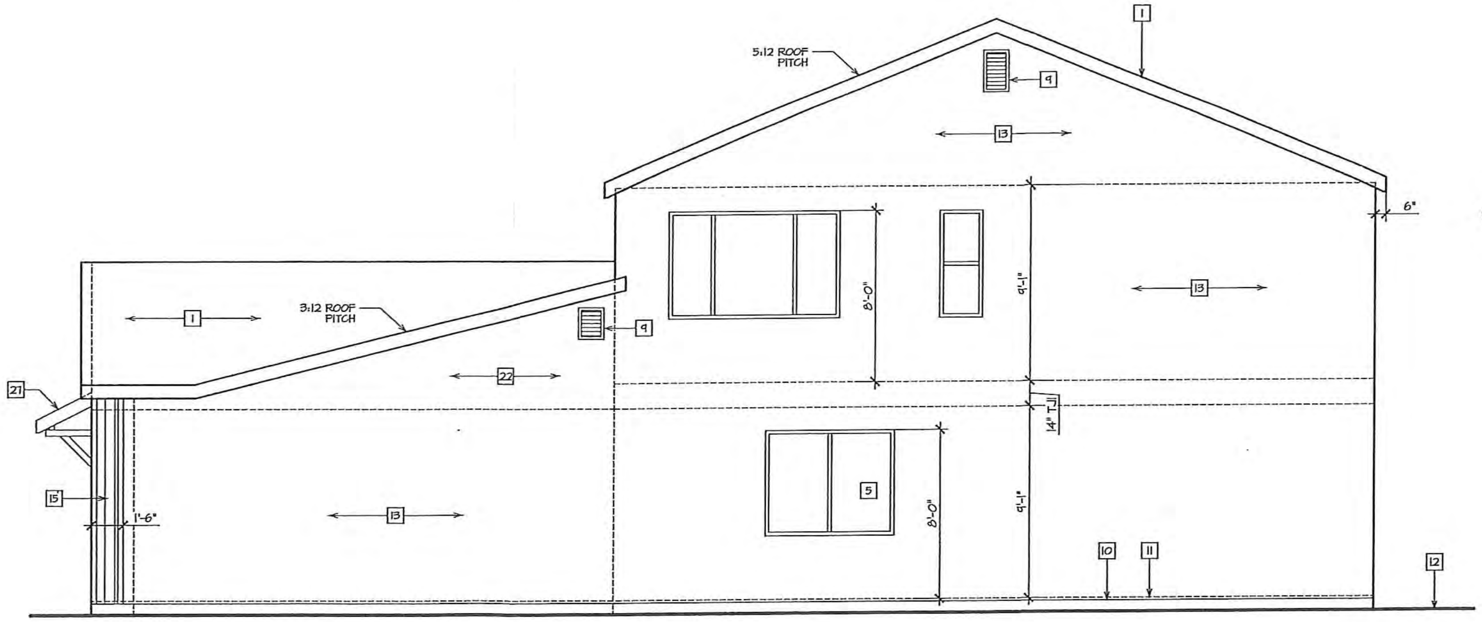
LEFT ELEV.- A
SCALE: 1/4" = 1'-0"



PARTIAL
LEFT ELEV.- B
SCALE: 1/4" = 1'-0"



PARTIAL
RIGHT ELEV.- B
SCALE: 1/4" = 1'-0"



RIGHT ELEV.- A
SCALE: 1/4" = 1'-0"

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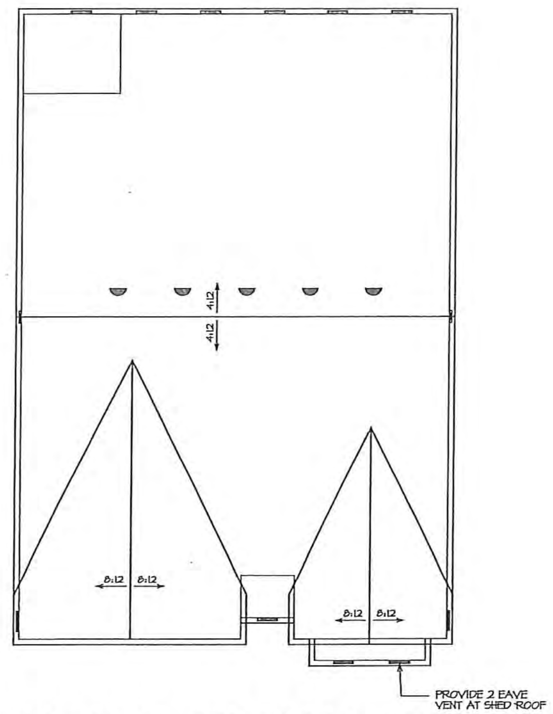

ROOF ATTIC VENT PLAN A & B

SCALE: 1/8" = 1'-0"

ATTIC VENT CALCULATIONS:

ATTIC AREA = 2,330 SQ. FT.
REQUIRED: 2330 / 300 x 144 = 1,119 SQ. IN.
USE: ART'S SHEET METAL VENTS OR EQUIVALENT
UPPER ATTIC VENT: (40% TO 50%)
(5) 5" ROOF EYEBROW VENTS (50 SQ. IN) = 250 SQ. IN.
(2) 14" X 24" GABLE END VENTS (166 SQ. IN) = 332 SQ. IN.
LOWER ATTIC VENT:
(9) 3-1/2" x 22-1/2" EAVE VENTS (65 SQ. IN.) = 585 SQ. IN.

TOTAL VENTILATION PROVIDED: = 1,167 SQ. IN.
(SEE PLAN FOR LOCATION)

ATTIC VENT NOTE:

- PROVIDE AT LEAST 40% AND NOT MORE THAN 50% OF THE REQUIRED VENTILATING AREA IS PROVIDED BY VENTILATORS LOCATED IN THE UPPER PORTION OF THE ATTIC OR RAFTER SPACE. UPPER VENTILATORS SHALL BE LOCATED NOT MORE THAN 3 FEET BELOW THE RIDGE OR HIGHEST POINT OF THE SPACE, WITH THE BALANCE OF THE REQUIRED VENTILATION PROVIDED BY EAVE OR CORNICE VENTS.
- MINIMUM 1/8" AND MAXIMUM 1/4" MESH IN ALL VENTS.
- PROVIDE MINIMUM 1" AIR SPACE BETWEEN INSULATION AND THE ROOF SHEATHING AND AT THE LOCATION OF THE VENT WHERE EAVE OR CORNICE VENTS ARE INSTALLED WITH 4 FEET LONG BAFFLES MINIMUM.

ROOF ATTIC VENT LEGEND:

▬ 9 PCS- 3-1/2" X 22-1/2" EAVE VENT
◗ 5 PCS- 5" ROOF EYEBROW VENT (3' MAX. AT RIDGE)
▬ 2 PCS- 14" X 24" UPPER GABLE END VENT

☐	ELEVATION KEYNOTES
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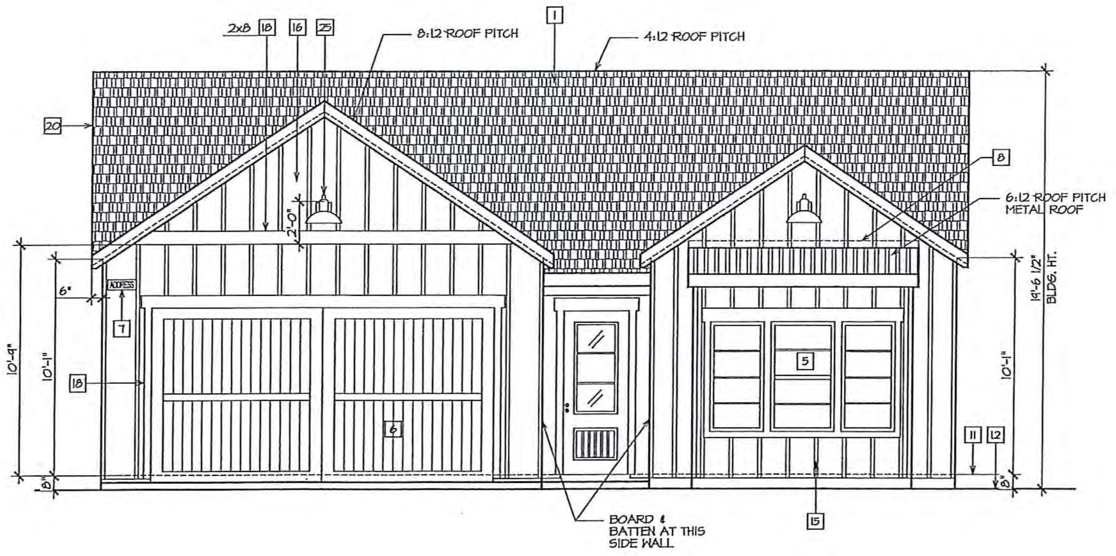
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-3.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (IES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 4x4 POST WITH STUCCO FINISH
24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT

NOTE FOR RADIANT BARRIER:

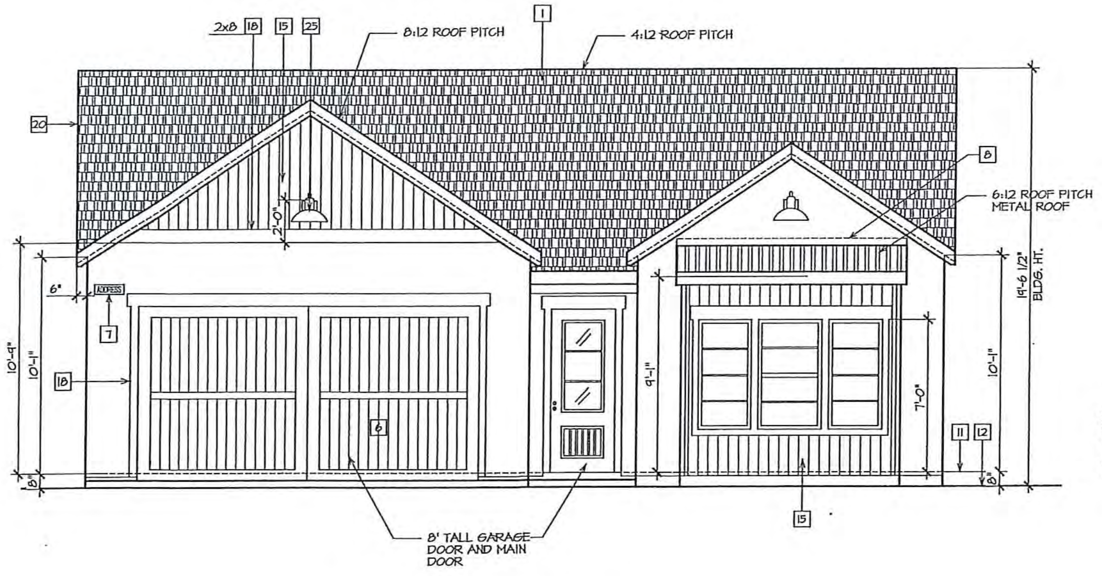
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1310) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"



FRONT ELEV.- A

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
Plans Approved Under the 2016 California Building Codes
16SPN
OCT 23 2019
Subject To Field Approval,
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Approved With Noted Corrections

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REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 4021 (ARIA)

DATE
JANUARY 17, 2019

PROJECT
CORONET SERIES

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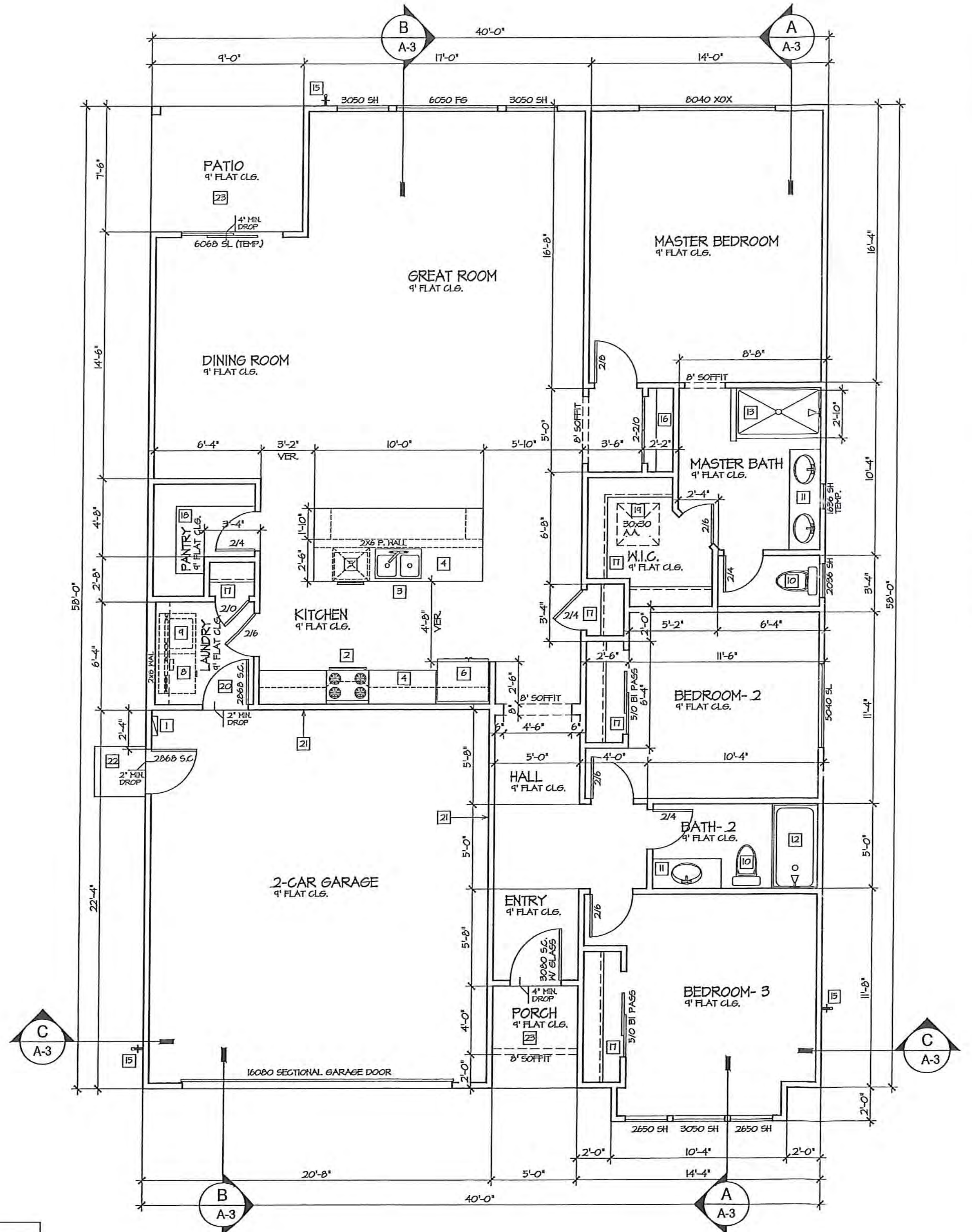
SHEET NO.
A-2
OF ___ SHEETS



FLOOR PLAN 1,787 SQ. FT.

SCALE: 1/4" = 1'-0"

Residential Site Plan Review Number 17-20

FLOOR PLAN DIMENSION NOTE:

- FLOOR PLAN WALLS SHOWN ARE NOMINAL IN WIDTH.
- DIMENSION SHOWN ARE PLUS OR MINUS.
- IT IS THE FRAMER'S RESPONSIBILITY TO ADJUST ALL CLEARANCES PRIOR TO CONSTRUCTION.
- ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGNER BEFORE COMMENCING OF ANY WORK.

FLOOR PLAN KEY NOTES:

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI (RUC80IN) OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	WALL TYPE LAVATORY WITH PEDESTAL. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
8	DRYER SPACE- PROVIDE BACKDRAFT DAMPER @ VENT TERMINATION
9	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
10	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
11	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
12	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
14	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
15	HOSE BIB- PROVIDE NON-REMOVABLE BACK FLOW PREVENTERS
16	LINEN CLOSET W/ 5 STACK SHELVES (12" MIN.)
17	CLOTHES CLOSET WITH SHELF AND POLE
18	PANTRY WITH 5 STACK SHELVES (16" MIN.)
19	22"x30" MIN. ATTIC ACCESS & 30"x30" FOR FURNACE WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. "THE ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS."
20	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
21	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED.
22	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
23	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
24	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 FOR GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality insulation installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- — None —

REQUIRED SPECIAL FEATURES
- PV System: 2.0 kWdc

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
    A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
    B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSA B125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.27	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR		

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL	R-13 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY WALL	R-19
ROOF W/ Radiant Barrier	R-38
ROOF @ FAU W/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 E.F.
REFER TO CFIR FOR MORE DETAILS AND INFORMATION	

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1		
2		
3		
4		
5		

CLOVIS
PLAN 4021 (ARIA)

DATE	PROJECT
JANUARY 17, 2019	CORONET SERIES

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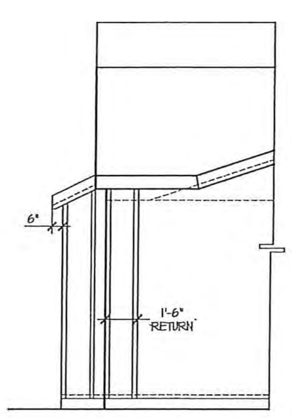
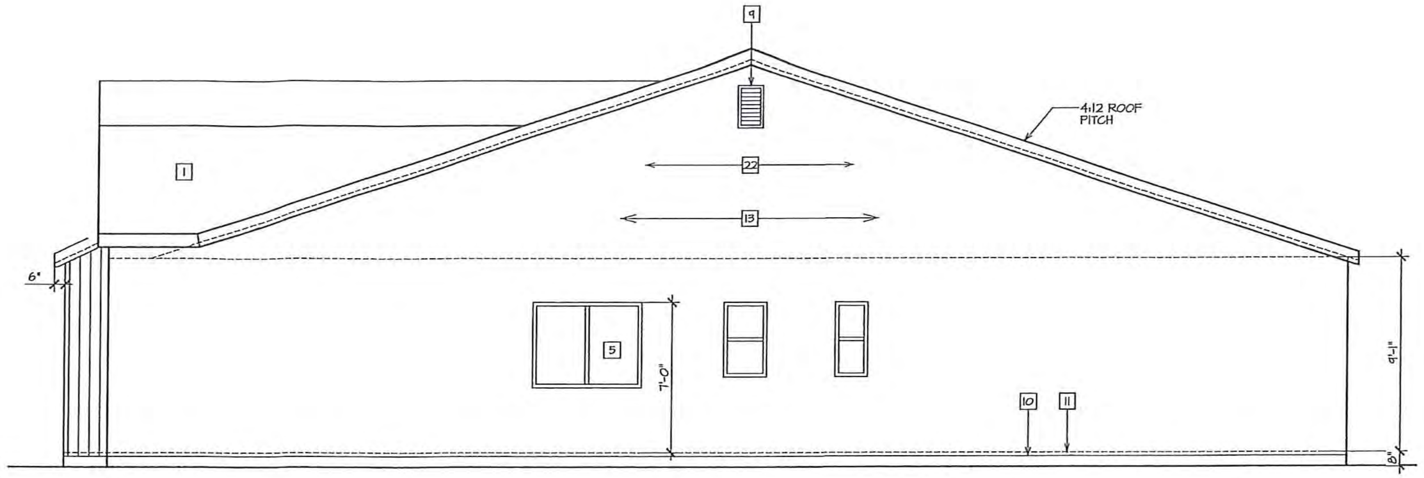
SHEET NO.
A-1
OF ___ SHEETS



PARTIAL
RIGHT ELEV.- B

SCALE: 1/4" = 1'-0"



RIGHT ELEV.

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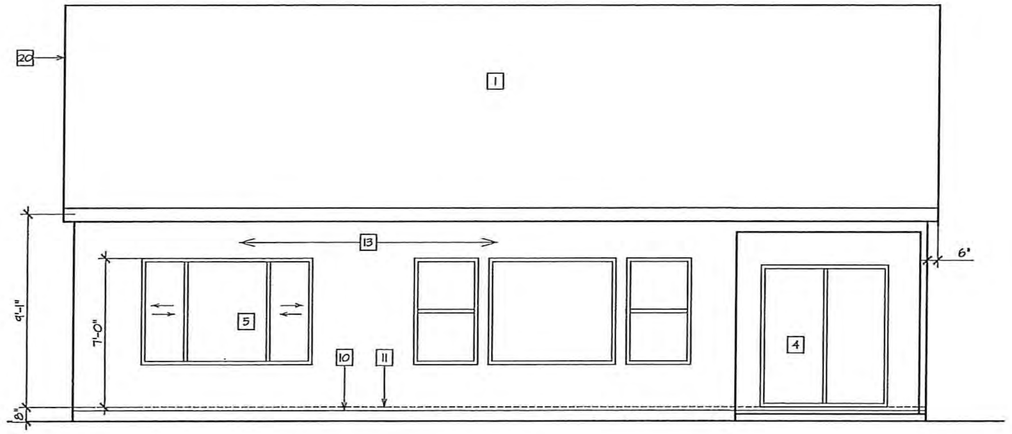
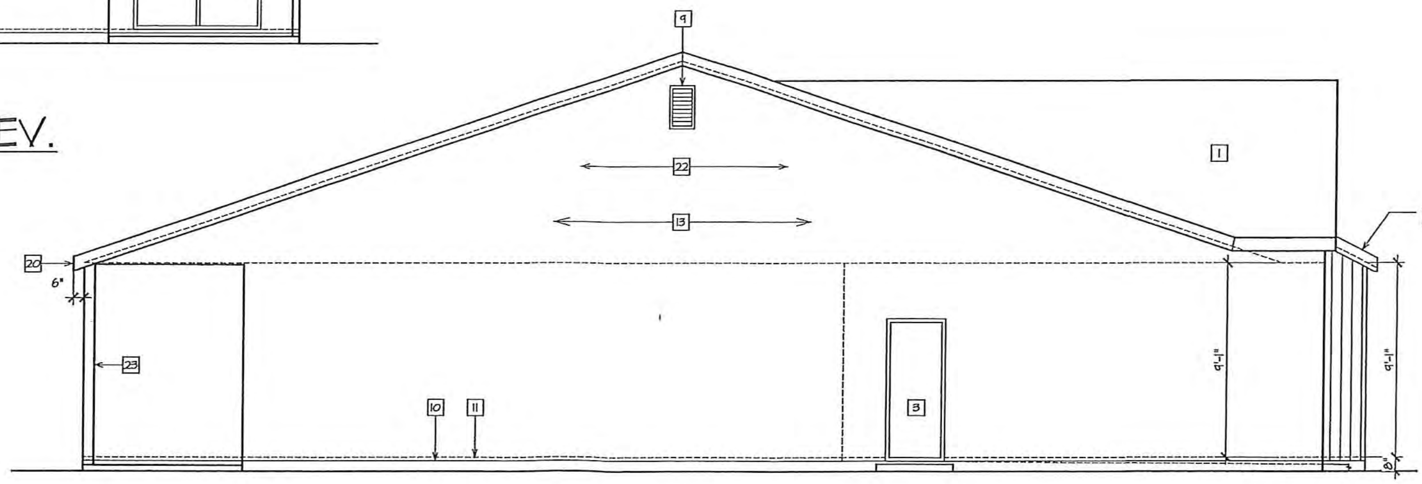


TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"

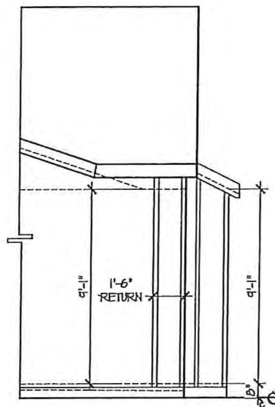
☐	ELEVATION KEYNOTES
	SEE ELEVATION KEYNOTES ON SHEET A-2

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL
NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



LEFT ELEV.

SCALE: 1/4" = 1'-0"



PARTIAL
LEFT ELEV.- B

SCALE: 1/4" = 1'-0"

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CLOVIS
PLAN 4021 (ARIA)

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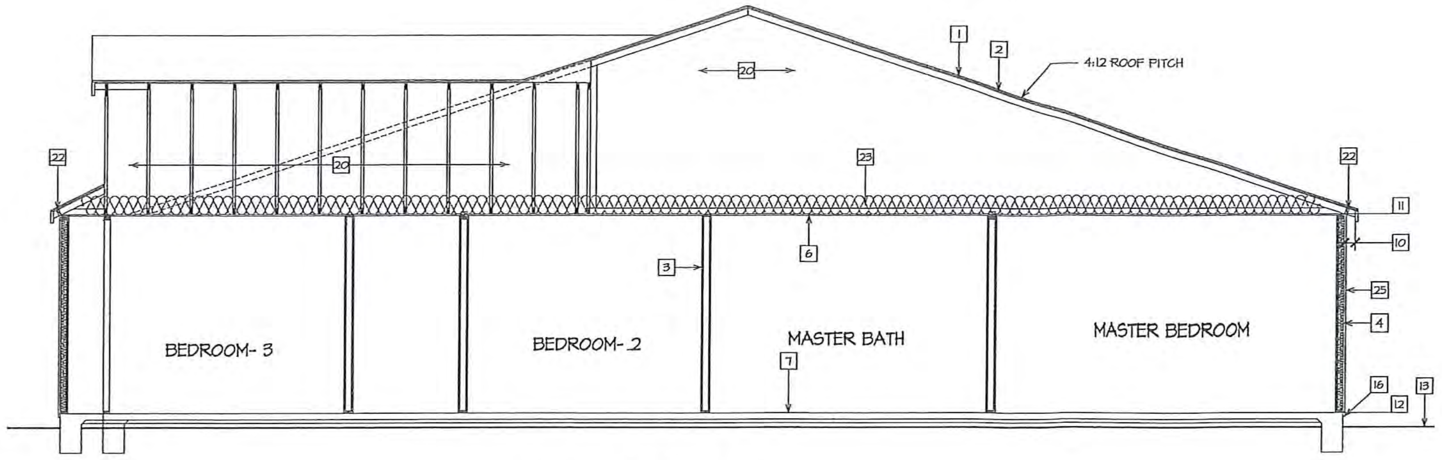
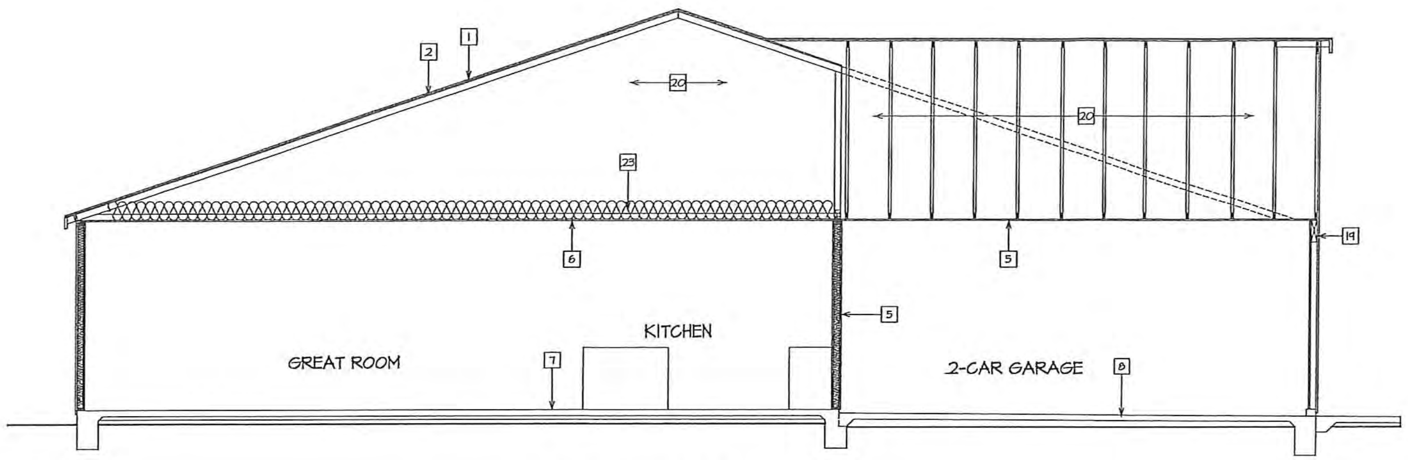


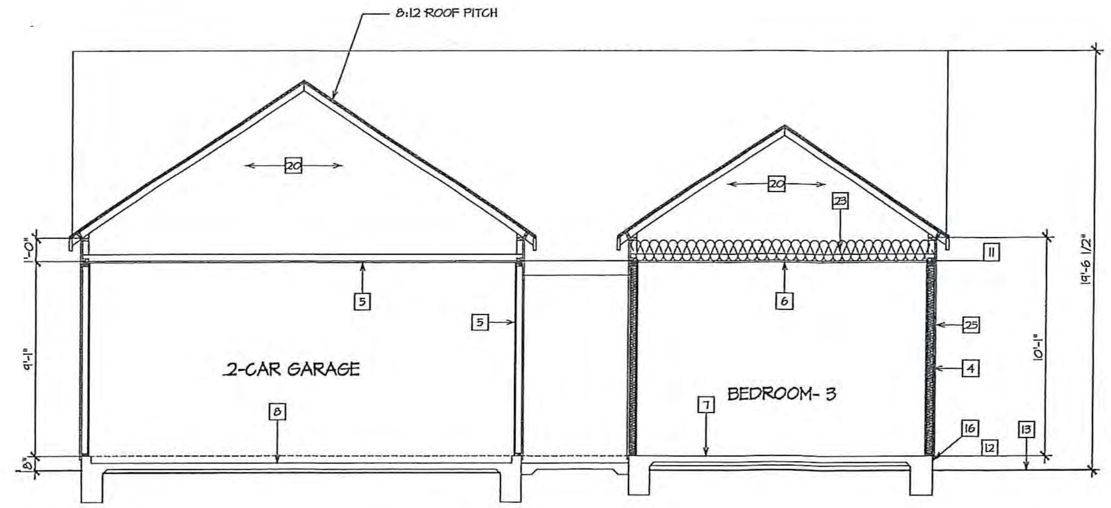
SECTION A-A

SCALE: 1/4" = 1'-0"



SECTION B-B

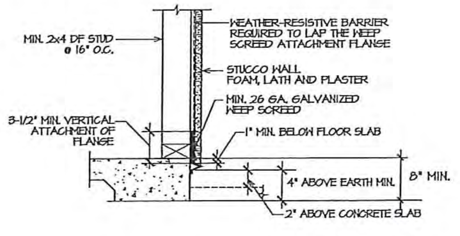
SCALE: 1/4" = 1'-0"



SECTION C-C

SCALE: 1/4" = 1'-0"

☐	SECTION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT O/ ROOF SHEATHING. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
2	ROOF SHEATHING: SEE ROOF SHEATHING SCHEDULE ON ROOF FRAMING PLAN
3	2x4 INTERIOR DF STUDS @ 24" O.C. W/ 1/2" THK. GYP. BOARD. TAPE & FINISH AS REQUIRED.
4	2x4 EXTERIOR DF STUDS @ 16" O.C. W/ R-13 BATT INSULATION. SEE SCHEDULE ON FRAMING PLAN
5	PROVIDE 5/8" (TYPE 'X') SHEET ROCK AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED.
6	MIN. 1/2" GYPSUM BOARD SHALL BE APPLIED PERPENDICULAR TO FRAMING NOT MORE THAN 24" O.C. AT CEILING PANEL
7	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER PLAN
8	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
9	TYPICAL DUAL GLAZE WINDOW. SEE FLOOR PLAN FOR SIZE AND FENESTRATION
10	ROOF OVERHANG - TYPICAL 6" MINIMUM (U.N.O.)
11	TOP OF PLATE LINE- 9'-1" FROM FINISH FLOOR LINE TYP. (U.N.O.)
12	FINISH FLOOR LINE- 8" MIN. FROM FINISH GRADE
13	FINISHED GRADE- TO COMPLY W/ MIN. GRADE SLOPE PER CRC-R4013
14	SECTIONAL GARAGE DOOR W/ AUTO. GARAGE DOOR OPENER. SEE MANUF. SPECS. PRIOR TO INSTALLATION.
15	TYP. CALIFORNIA FILL W/ 2x4 FILL RAFTERS @ 24" O.C.
16	PROVIDE WEEP SCREED AT ALL EXTERIOR LOCATIONS INCLUDING PORCH AND PATIO AREAS PER DET. 1/A-3
17	EXTERIOR DOOR- SOLID CORE DOOR OR TEMPERED W/ THRESHOLD AND WEATHER STRIPPING.
18	EXTERIOR CEILING- STUCCO O/ HIGH RIB METAL LATH.
19	BEAM/ HEADER- SEE ROOF FRAMING PLAN FOR SCHEDULE.
20	PRE-FAB. WOOD TRUSSES AT 24" O.C. (TYPICAL) SEE ROOF FRAMING PLAN.
21	CONTINUOUS WALL FOOTING . SEE FOUNDATION PLAN
22	PROVIDE 2x SOLID BLOCKING AT ALL TRUSSES OR RAFTER SUPPORTS.
23	R-38 CEILING/ATTIC INSULATION: BLOWN OR POURED TYPE INSULATING MATERIALS SHALL BE USED IN ATTIC SPACES WHERE THE SLOPE OF THE CEILING DOES NOT EXCEED MORE THAN 4:12 PITCH. R-30 INSUL. @ ATTIC F.A.U. SEE ENERGY COMPLIANCE REQUIREMENTS.
24	MIN. R-19 BATT INSUL. AT ALL ATTIC PONY OR KNEE WALLS ON ATTIC SPACE AND EXTERIOR FLOOR JOIST
25	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)



NOTE:
WHEN "J SCREED" IS PROVIDED, THIS IS TO BE PERFORATED FOR PROPER MITIGATION OF MOISTURE AS REQUIRED W/ 2" BELOW FLOOR SLAB

1 / A-3 WEEP SCREED DETAIL

FOR ALL EXTERIOR WALL LOCATIONS, INCLUDING PORCH, PATIO AREAS AND STUCCO BASE COLUMNS

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 4021 (ARIA)

DATE
JANUARY 17, 2019

PROJECT
CORONET SERIES

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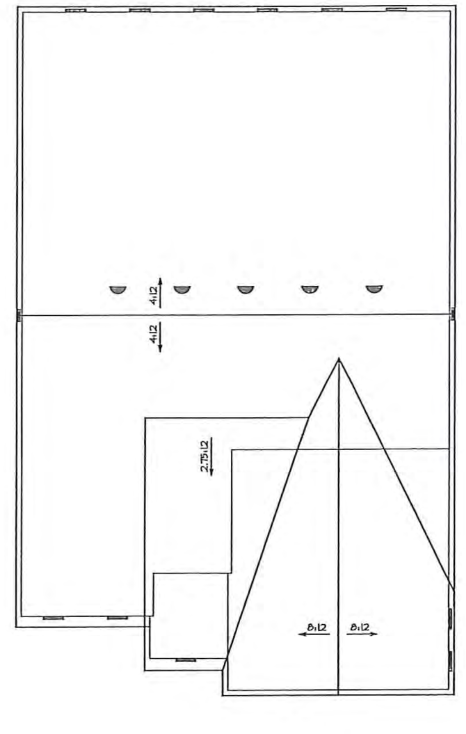
SHEET NO.
A-3
OF ___ SHEETS



ROOF ATTIC VENT PLAN A & B

SCALE: 1/8" = 1'-0"

ATTIC VENT CALCULATIONS:

ATTIC AREA = 2,412 SQ. FT.
REQUIRED: 2412 / 300 x 144 = 1,158 SQ. IN.
USE: ART'S SHEET METAL VENTS OR EQUIVALENT
UPPER ATTIC VENT: (40% TO 50%)
(5) 5" ROOF EYEBROW VENTS (50 SQ. IN) = 250 SQ. IN.
(2) 14" X 24" GABLE END VENTS (166 SQ. IN) = 332 SQ. IN.
LOWER ATTIC VENT:
(11) 3-1/2" x 22-1/2" EAVE VENTS (65 SQ. IN.) = 715 SQ. IN.

TOTAL VENTILATION PROVIDED: = 1,297 SQ. IN.
(SEE PLAN FOR LOCATION)

ATTIC VENT NOTE:

- PROVIDE AT LEAST 40% AND NOT MORE THAN 50% OF THE REQUIRED VENTILATING AREA IS PROVIDED BY VENTILATORS LOCATED IN THE UPPER PORTION OF THE ATTIC OR RAFTER SPACE. UPPER VENTILATORS SHALL BE LOCATED NOT MORE THAN 3 FEET BELOW THE RIDGE OR HIGHEST POINT OF THE SPACE, WITH THE BALANCE OF THE REQUIRED VENTILATION PROVIDED BY EAVE OR CORNICE VENTS.
- MINIMUM 1/8" AND MAXIMUM 1/4" MESH IN ALL VENTS.
- PROVIDE MINIMUM 1" AIR SPACE BETWEEN INSULATION AND THE ROOF SHEATHING AND AT THE LOCATION OF THE VENT WHERE EAVE OR CORNICE VENTS ARE INSTALLED WITH 4 FEET LONG BAFFLES MINIMUM.

ROOF ATTIC VENT LEGEND:

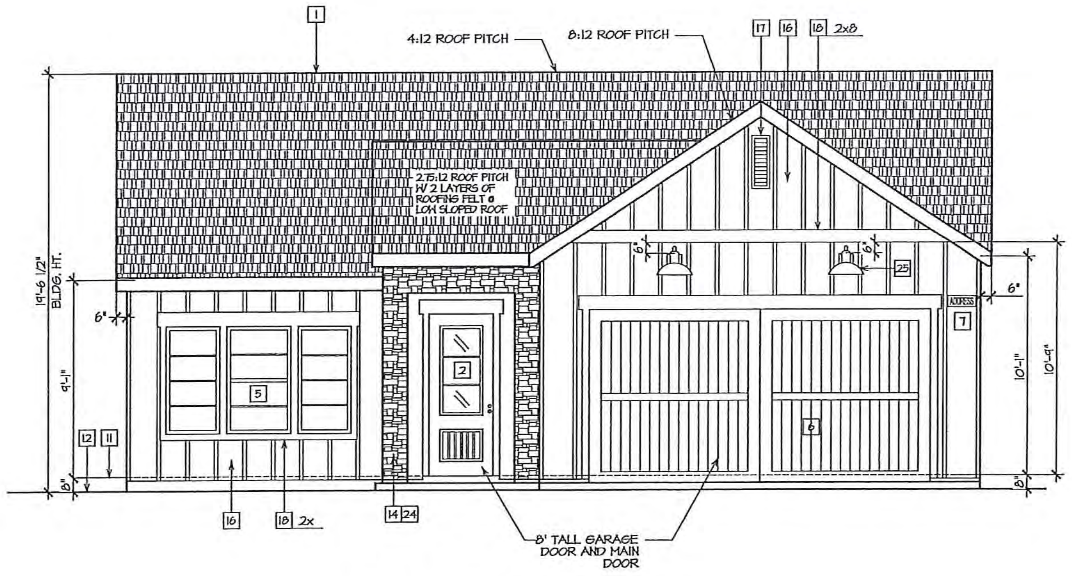
▬ 11 PCS- 3-1/2" X 22-1/2" EAVE VENT
◖ 5 PCS- 5" ROOF EYEBROW VENT (3' MAX. AT RIDGE)
▬ 2 PCS- 14" X 24" UPPER GABLE END VENT

ELEVATION KEYNOTES

☐	
1	CLASS 'A' ASPHALT ROOFING O/ MIN. 15# ROOFING FELT O/ ROOF SHEATHING. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-3.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 4x4 POST WITH STUCCO FINISH
24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT

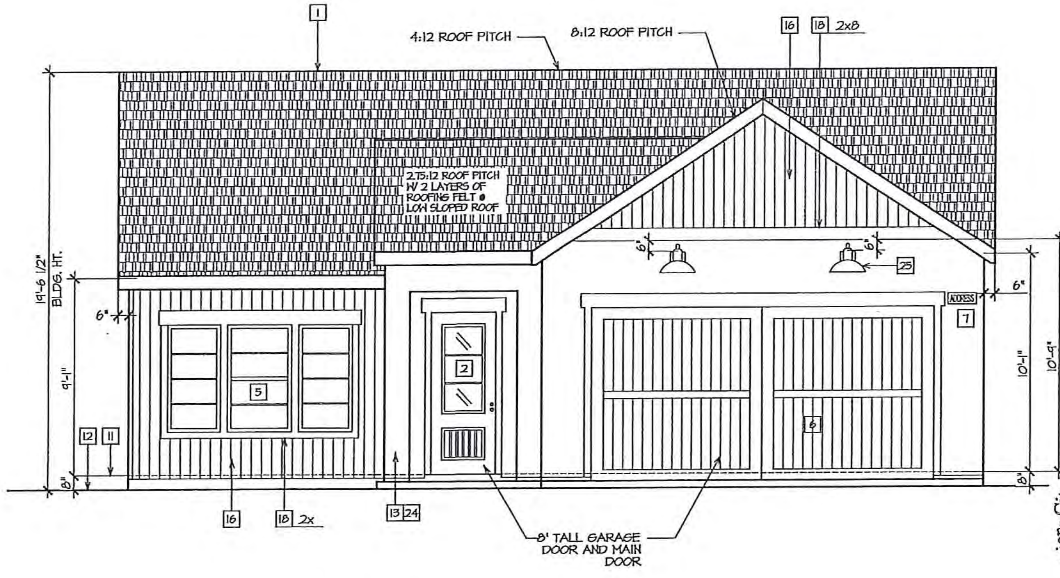
NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL.
NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"



FRONT ELEV.- A

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
Plans Approved Under the 2016 California Building Codes
16SPN
OCT 24 2019
Subject To Field Approval, Laws, Codes, and Ordinances
Approved With Noted Corrections

REV.	DATE	DESCRIPTION OF WORK
△1		
△2		
△3		
△4		
△5		

CLOVIS
PLAN 4022 (CADENCE)

DATE	PROJECT
JANUARY 11, 2019	CORONET SERIES

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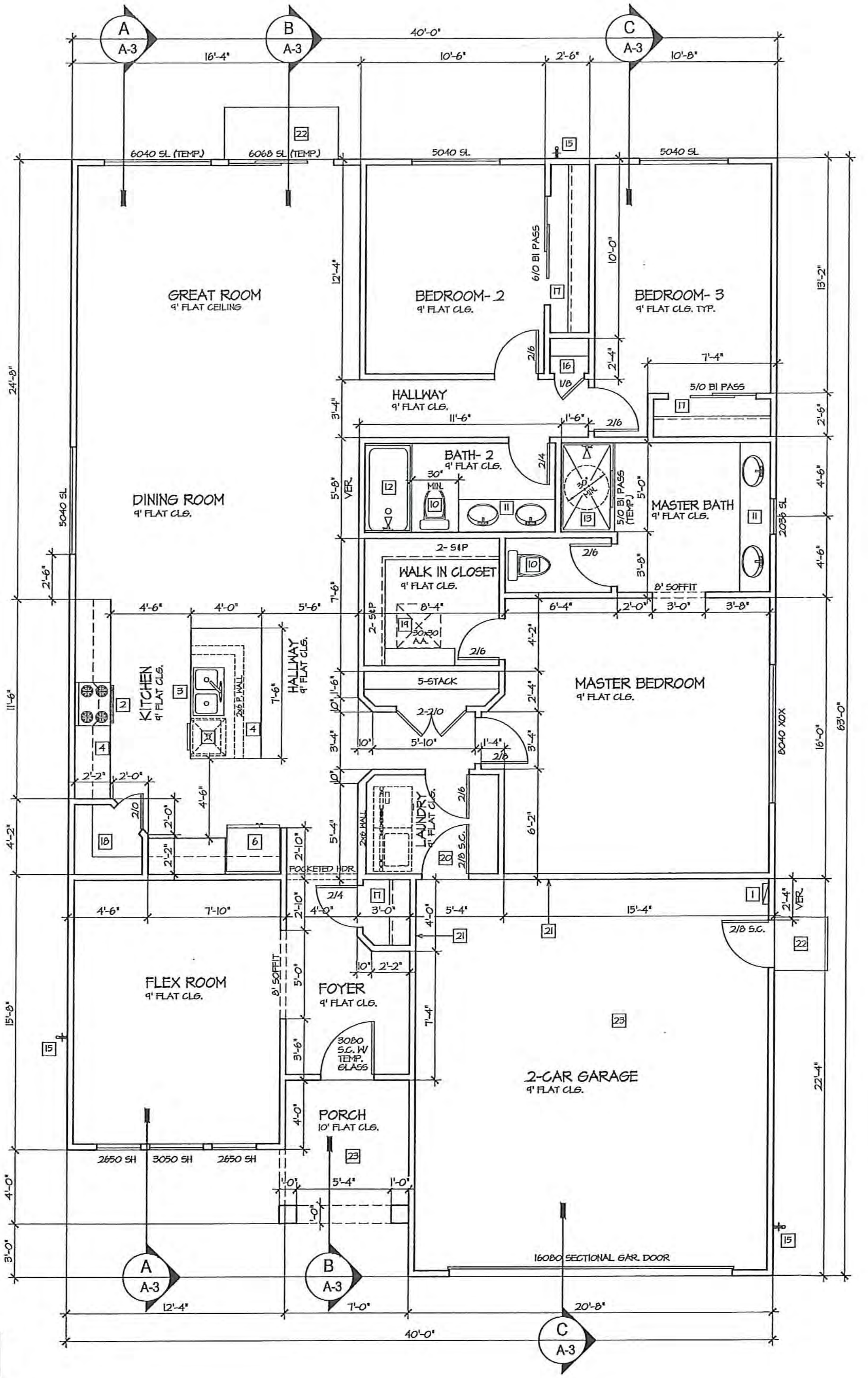
8080 N. PALM AVE. SUITE 110, FRESNO, CA. 93711 PHONE (559) 447-3400

SHEET NO.
A-2
OF ___ SHEETS



FLOOR PLAN 1,898 SQ. FT.

SCALE: 1/4" = 1'-0"

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI (RUCBOIN) OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	WALL TYPE LAVATORY WITH PEDESTAL. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
8	DRYER SPACE- PROVIDE BACKDRAFT DAMPER @ VENT TERMINATION
9	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
10	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
11	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
12	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
14	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
15	HOSE BIB- PROVIDE NON REMOVABLE BACK FLOW PREVENTERS
16	LINEN CLOSET W/ 5 STACK SHELVES (12" MIN.)
17	CLOTHES CLOSET WITH SHELF AND POLE
18	PANTRY WITH 5 STACK SHELVES (16" MIN.)
19	22"x30" MIN. ATTIC ACCESS & 30"x30" FOR FURNACE WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. "THE ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS."
20	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
21	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED.
22	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
23	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
24	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 FOR GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality Insulation Installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- -- None --

REQUIRED SPECIAL FEATURES
- PV System: 2.0 kWdc

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSAB125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.21	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR		

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL	R-13 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY WALL	R-19
ROOF W/ Radiant Barrier	R-38
ROOF @ FAU W/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 E.F.

REFER TO CFIR FOR MORE DETAILS AND INFORMATION

Residential Site Plan Review Number 17-20

FLOOR PLAN DIMENSION NOTE:
- FLOOR PLAN WALLS SHOWN ARE NOMINAL IN WIDTH.
- DIMENSION SHOWN ARE PLUS OR MINUS.
- IT IS THE FRAMER'S RESPONSIBILITY TO ADJUST ALL CLEARANCES PRIOR TO CONSTRUCTION.
- ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGNER BEFORE COMMENCING OF ANY WORK.

168RN
OCT 24 2019

REV.	DATE	DESCRIPTION OF WORK
1		
2		
3		
4		
5		

CLOVIS
PLAN 4022 (CADENCE)

DATE	PROJECT
JANUARY 17, 2019	CORONET SERIES

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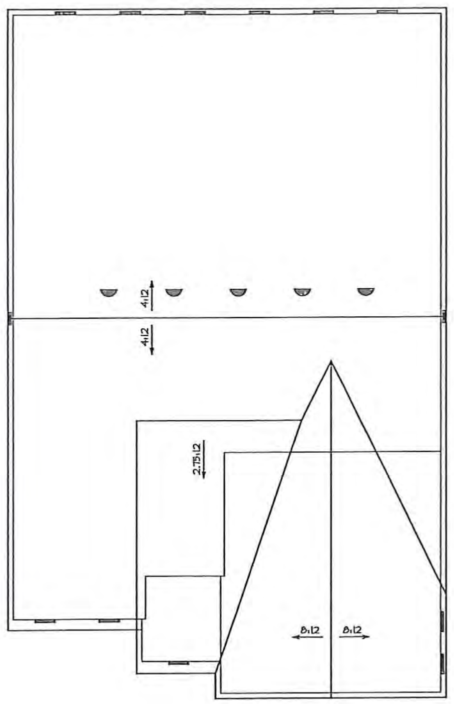
SHEET NO.
A-1
OF ___ SHEETS



ROOF ATTIC VENT PLAN A & B

SCALE: 1/8" = 1'-0"

ATTIC VENT CALCULATIONS:

ATTIC AREA = 2,412 SQ. FT.	
REQUIRED: 2412 / 300 x 144	= 1,158 SQ. IN.
USE: ART'S SHEET METAL VENTS OR EQUIVALENT	
<u>UPPER ATTIC VENT:</u> (40% TO 50%)	
(5) 5" ROOF EYEBROW VENTS (50 SQ. IN)	= 250 SQ. IN.
(2) 14" X 24" GABLE END VENTS (166 SQ. IN)	= 332 SQ. IN.
<u>LOWER ATTIC VENT:</u>	
(11) 3-1/2" x 22-1/2" EAVE VENTS (65 SQ. IN.)	= 715 SQ. IN.
TOTAL VENTILATION PROVIDED: (SEE PLAN FOR LOCATION)	= 1,297 SQ. IN.

ATTIC VENT NOTE:

- PROVIDE AT LEAST 40% AND NOT MORE THAN 50% OF THE REQUIRED VENTILATING AREA IS PROVIDED BY VENTILATORS LOCATED IN THE UPPER PORTION OF THE ATTIC OR RAFTER SPACE. UPPER VENTILATORS SHALL BE LOCATED NOT MORE THAN 3 FEET BELOW THE RIDGE OR HIGHEST POINT OF THE SPACE, WITH THE BALANCE OF THE REQUIRED VENTILATION PROVIDED BY EAVE OR CORNICE VENTS.
- MINIMUM 1/8" AND MAXIMUM 1/4" MESH IN ALL VENTS.
- PROVIDE MINIMUM 1" AIR SPACE BETWEEN INSULATION AND THE ROOF SHEATHING AND AT THE LOCATION OF THE VENT WHERE EAVE OR CORNICE VENTS ARE INSTALLED WITH 4 FEET LONG BAFFLES MINIMUM.

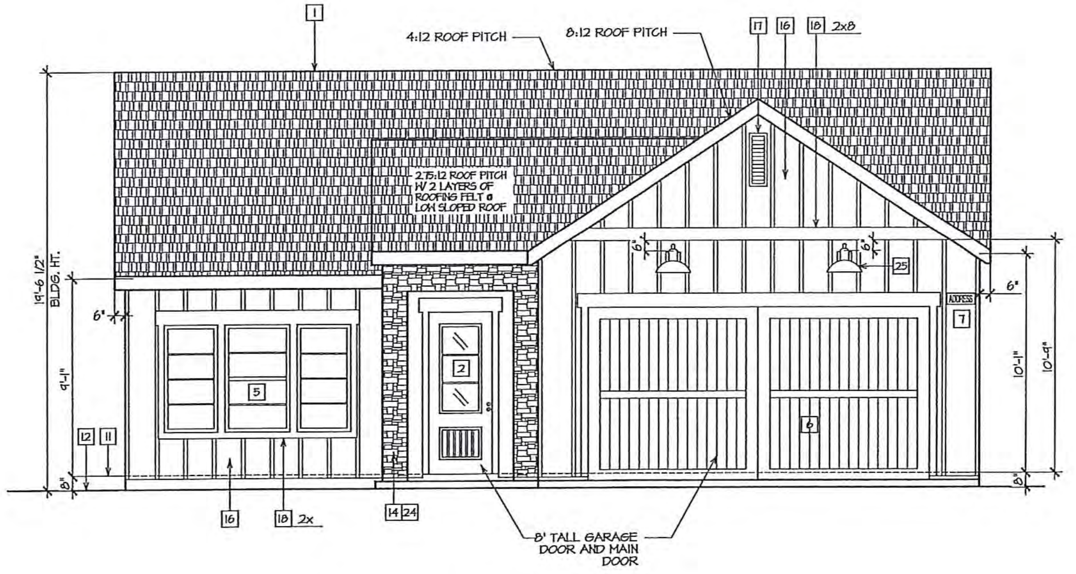
ROOF ATTIC VENT LEGEND:

▬	11 PCS- 3-1/2" X 22-1/2" EAVE VENT
◒	5 PCS- 5" ROOF EYEBROW VENT (3' MAX. AT RIDGE)
▬	2 PCS- 14" X 24" UPPER GABLE END VENT

ELEVATION KEYNOTES

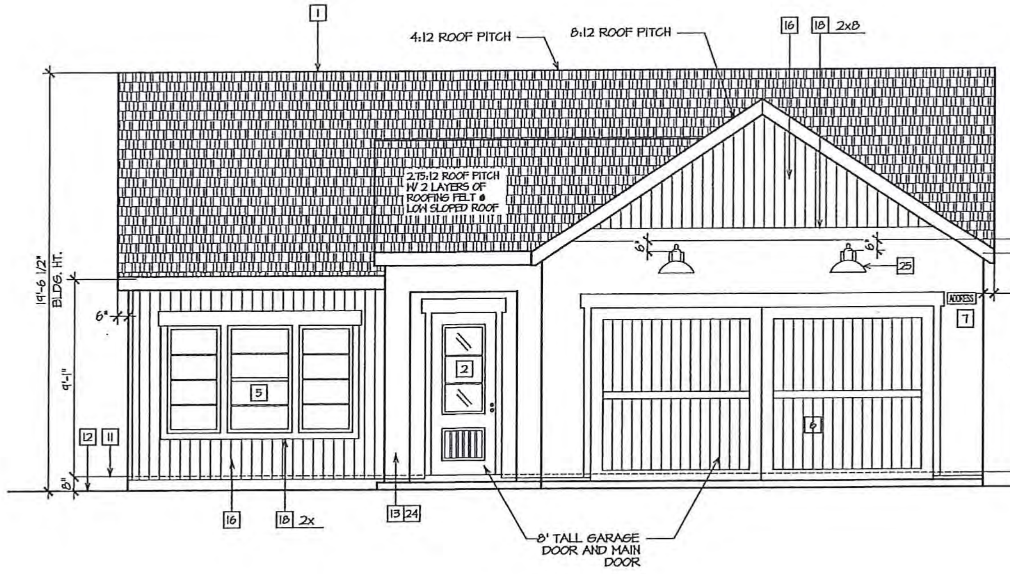
☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ MIN. 15# ROOFING FELT O/ ROOF SHEATHING. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-3.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 4x4 POST WITH STUCCO FINISH
24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT

NOTE FOR RADIANT BARRIER:
<u>USE</u> LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1310) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS <u>OR</u> ANY APPROVED EQUAL
<u>NOTE:</u>
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"



FRONT ELEV.- A

SCALE: 1/4" = 1'-0"

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REV.	DATE	DESCRIPTION OF WORK
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CLOVIS
PLAN 4022 (CADENCE)
PROJECT
CORONET SERIES
DATE
JANUARY 11, 2019

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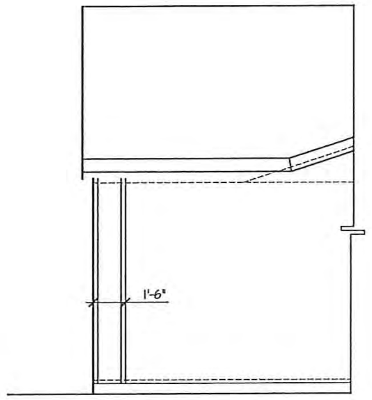
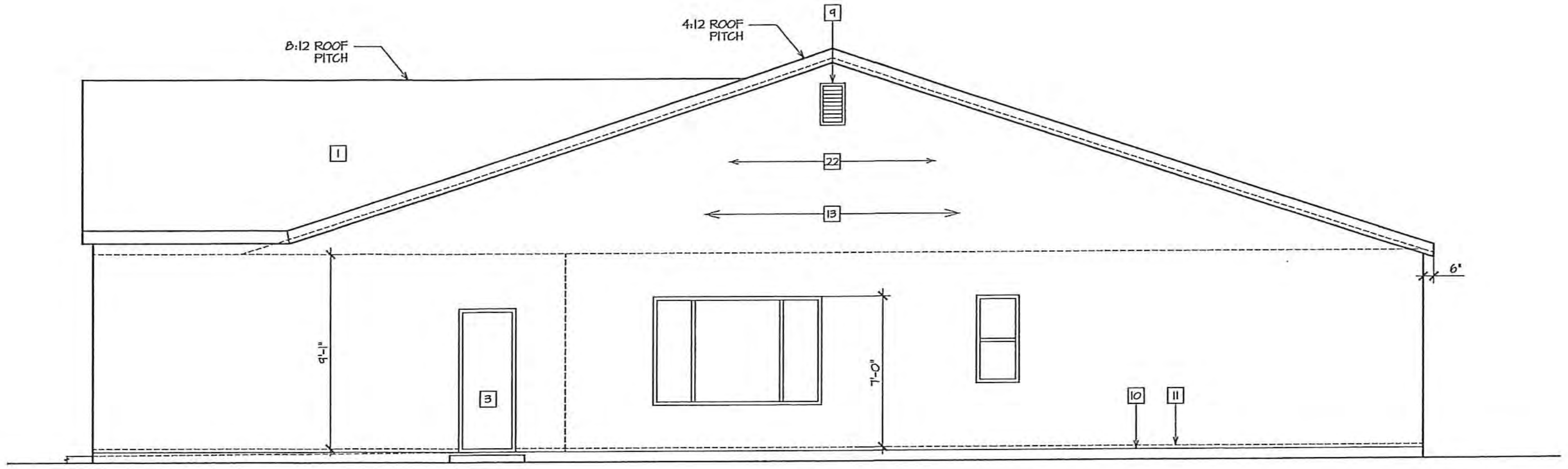
SHEET NO.
A-2
OF __ SHEETS



PARTIAL

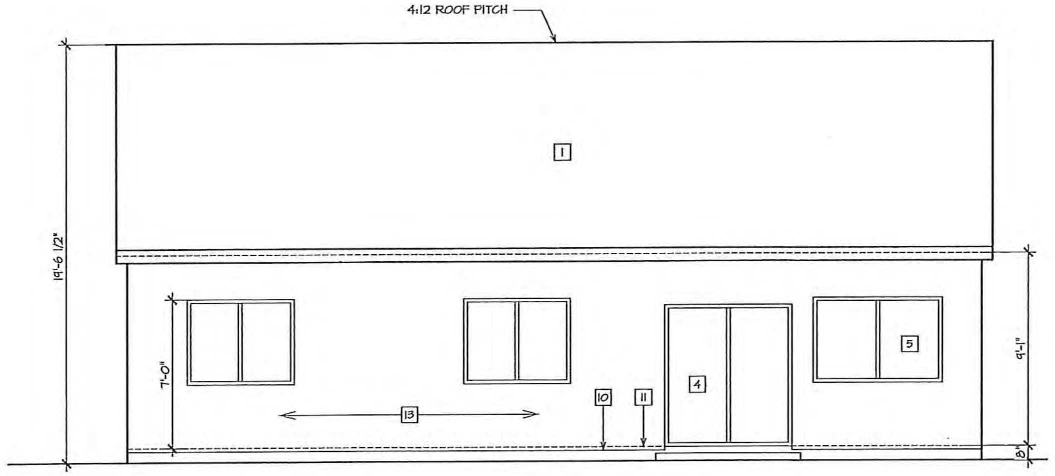
RIGHT ELEV.- B

SCALE: 1/4" = 1'-0"



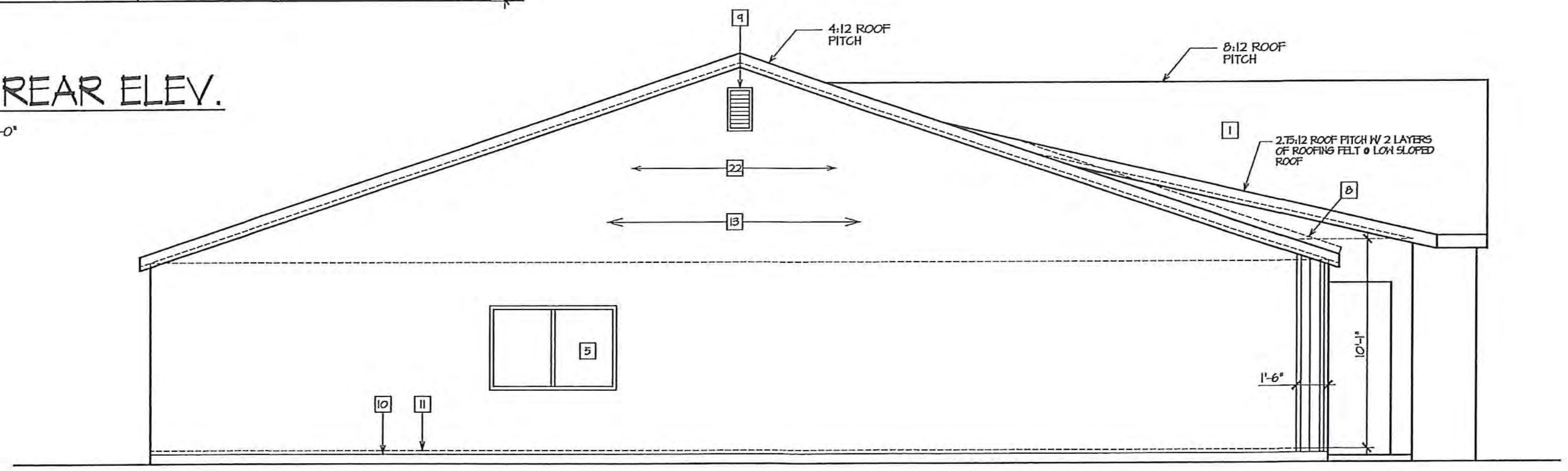
RIGHT ELEV.

SCALE: 1/4" = 1'-0"



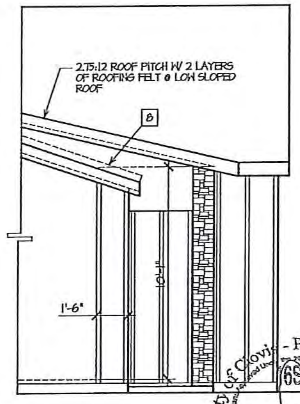
TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"



LEFT ELEV.

SCALE: 1/4" = 1'-0"



PARTIAL

LEFT ELEV.- B

SCALE: 1/4" = 1'-0"

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Plans Approved Under the 2016 California Building Codes
6SPN
OCT 24 2019

☐	**ELEVATION KEYNOTES**
	SEE ELEVATION KEYNOTES ON SHEET A-2

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS LICENSE NO. T 1370, OR ANY APPROVED EQUAL
NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

REV.	DATE	DESCRIPTION OF WORK
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CLOVIS

PLAN 4022 (CADENCE)

DATE: JANUARY 17, 2019

PROJECT: CORONET SERIES

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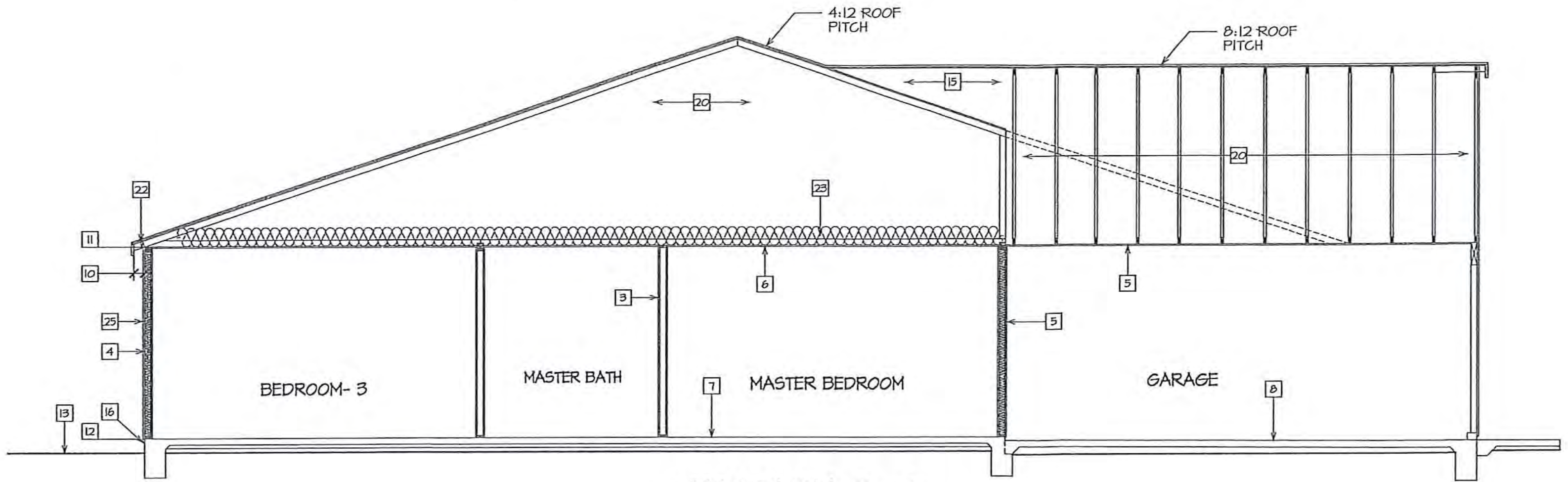
SHEET NO.

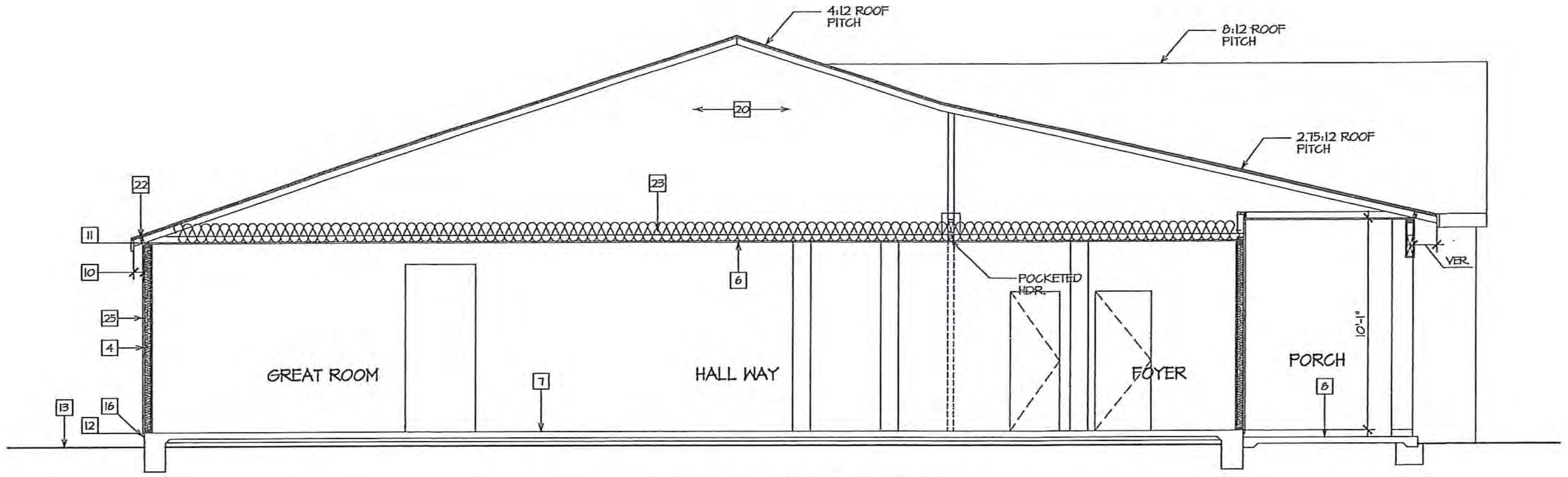
A-2.1

OF ___ SHEETS



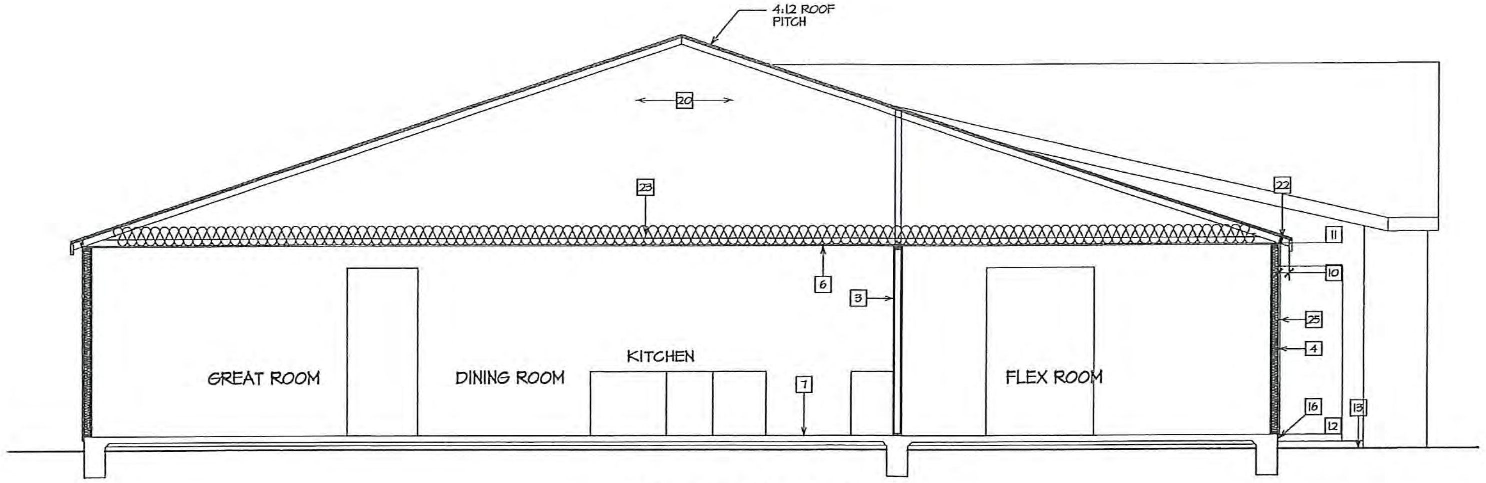
SECTION C-C

SCALE: 1/4" = 1'-0"



SECTION B-B

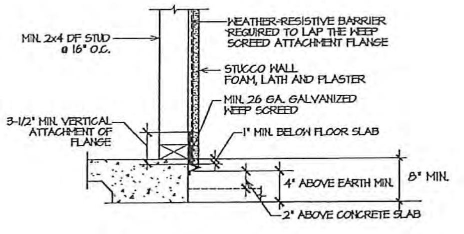
SCALE: 1/4" = 1'-0"



SECTION A-A

SCALE: 1/4" = 1'-0"

☐	SECTION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT O/ ROOF SHEATHING. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
2	ROOF SHEATHING: SEE ROOF SHEATHING SCHEDULE ON ROOF FRAMING PLAN
3	2x4 INTERIOR DF STUDS @ 24" O.C. W/ 1/2" THK. GYP. BOARD. TAPE & FINISH AS REQUIRED.
4	2x4 EXTERIOR DF STUDS @ 16" O.C. W/ R-13 BATT INSULATION. SEE SCHEDULE ON FRAMING PLAN
5	PROVIDE 5/8" (TYPE 'X') SHEET ROCK AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED.
6	MIN. 1/2" GYPSUM BOARD SHALL BE APPLIED PERPENDICULAR TO FRAMING NOT MORE THAN 24" O.C. AT CEILING PANEL
7	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER PLAN
8	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
9	TYPICAL DUAL GLAZE WINDOW. SEE FLOOR PLAN FOR SIZE AND FENESTRATION
10	ROOF OVERHANG - TYPICAL 6" MINIMUM (U.N.O.)
11	TOP OF PLATE LINE- 9'-1" FROM FINISH FLOOR LINE TYP. (U.N.O.)
12	FINISH FLOOR LINE- 8" MIN. FROM FINISH GRADE
13	FINISHED GRADE- TO COMPLY W/ MIN. GRADE SLOPE PER CRC-R401.3
14	SECTIONAL GARAGE DOOR W/ AUTO. GARAGE DOOR OPENER. SEE MANUF. SPECS. PRIOR TO INSTALLATION.
15	TYP. CALIFORNIA FILL W/ 2x4 FILL RAFTERS @ 24" O.C.
16	PROVIDE WEEP SCREED AT ALL EXTERIOR LOCATIONS INCLUDING PORCH AND PATIO AREAS PER DET. 1/A-3
17	EXTERIOR DOOR- SOLID CORE DOOR OR TEMPERED W/ THRESHOLD AND WEATHER STRIPPING.
18	EXTERIOR CEILING- STUCCO O/ HIGH RIB METAL LATH.
19	BEAM/ HEADER- SEE ROOF FRAMING PLAN FOR SCHEDULE.
20	PRE-FAB. WOOD TRUSSES AT 24" O.C. (TYPICAL) SEE ROOF FRAMING PLAN.
21	CONTINUOUS WALL FOOTING . SEE FOUNDATION PLAN
22	PROVIDE 2x SOLID BLOCKING AT ALL TRUSSES OR RAFTER SUPPORTS.
23	R-38 CEILING/ATTIC INSULATION: BLOWN OR POURED TYPE INSULATING MATERIALS SHALL BE USED IN ATTIC SPACES WHERE THE SLOPE OF THE CEILING DOES NOT EXCEED MORE THAN 4:12 PITCH. R-30 INSUL. @ ATTIC F.A.U. SEE ENERGY COMPLIANCE REQUIREMENTS.
24	MIN. R-19 BATT INSUL. AT ALL ATTIC PONY OR KNEE WALLS ON ATTIC SPACE AND EXTERIOR FLOOR JOIST
25	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL. (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)



NOTE:
WHEN "J SCREED" IS PROVIDED, THIS IS TO BE PERFORATED FOR PROPER MITIGATION OF MOISTURE AS REQUIRED W/ 2" BELOW FLOOR SLAB

1 / A-3 WEEP SCREED DETAIL

FOR ALL EXTERIOR WALL LOCATIONS, INCLUDING PORCH, PATIO AREAS AND STUCCO BASE COLUMNS

City of Clovis - Planning and Development Services - Building Division
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REV.	DATE	DESCRIPTION OF WORK
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CLOVIS
PLAN 4022 (CADENCE)

DATE: JANUARY 17, 2019
PROJECT: CORONET SERIES

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SHEET NO.
A-3
OF __ SHEETS

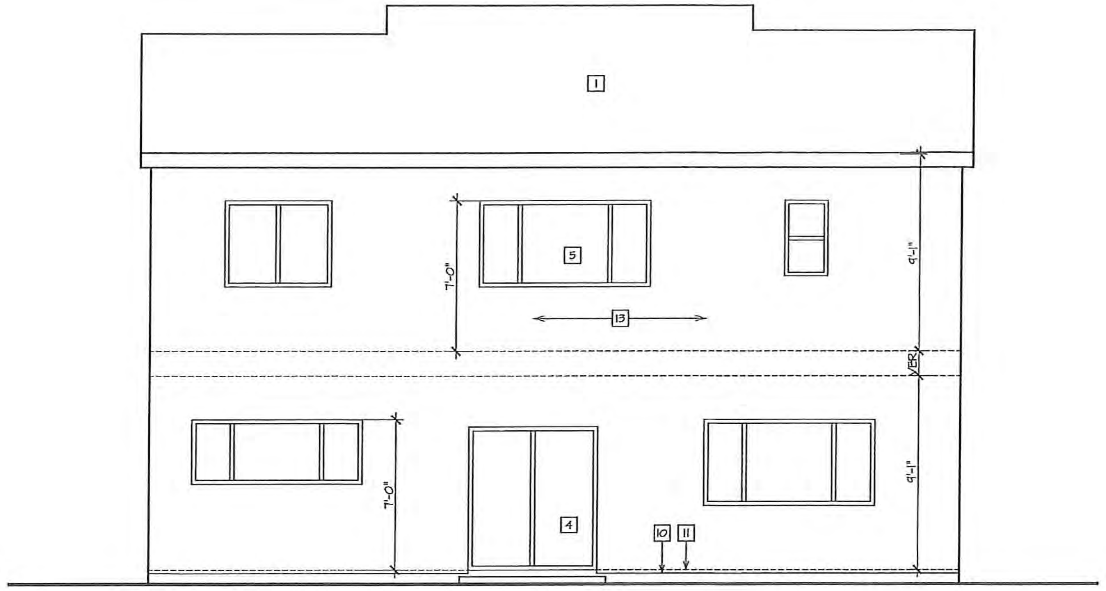
☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT OR CONCRETE ROOF FLAT TILE (ESR-1647) O/ 30# UNDERLAYMENT O/ ROOF SHEATHING. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-4.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (IES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 4x4 POST WITH STUCCO FINISH
24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT
26	PROVIDE WALL STRAP TO TIE DISCONTINUOUS TOP PLATE CS16 STRAP 48" LONG W/ 2x BLOCKING

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1310) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"

FRONT ELEV.- B

SCALE: 1/4" = 1'-0"

FRONT ELEV.- A

SCALE: 1/4" = 1'-0"

REV.	DATE	DESCRIPTION OF WORK
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CLOVIS

PLAN 4024 (HARMONY)

DATE	PROJECT
JANUARY 17, 2019	CORONET SERIES

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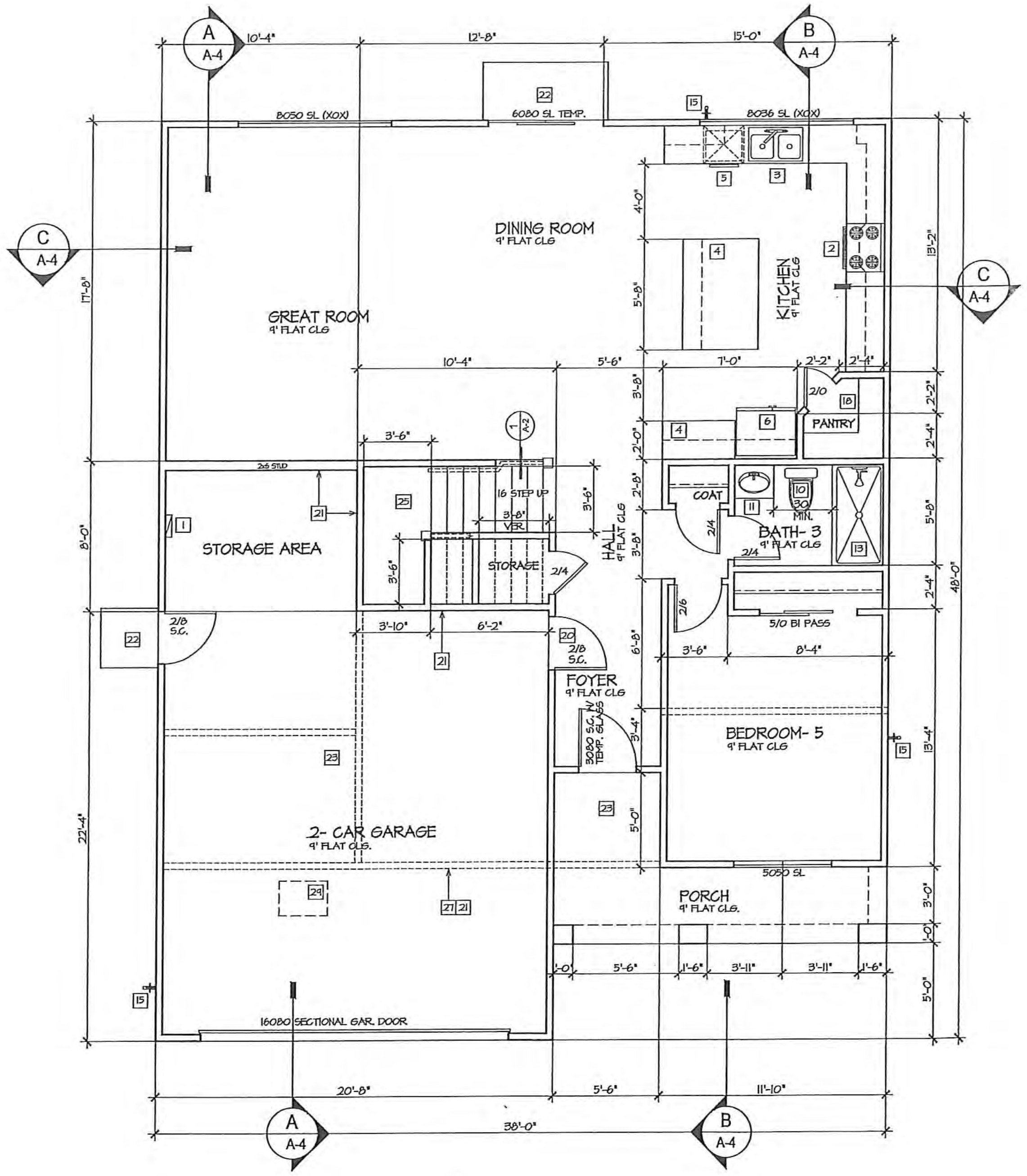
SHEET NO.

A-3

OF ___ SHEETS

FLOOR PLAN DIMENSION NOTE:
- FLOOR PLAN WALLS SHOWN ARE NOMINAL IN WIDTH.
- DIMENSION SHOWN ARE PLUS OR MINUS.
- IT IS THE FRAMER'S RESPONSIBILITY TO ADJUST ALL CLEARANCES PRIOR TO CONSTRUCTION.
- ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGNER BEFORE COMMENCING OF ANY WORK.



FIRST FLOOR PLAN 1,103 SQ. FT.

SCALE: 1/4" = 1'-0"

Residential Site Plan Review Number 17-20

FLOOR PLAN KEY NOTES:

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI (RUCBOIN) OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	WALL TYPE LAVATORY WITH PEDESTAL. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
8	DRYER SPACE- PROVIDE BACKDRAFT DAMPER @ VENT TERMINATION
9	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
10	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
11	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
12	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 2.0 GALLONS PER MINUTE AT 80 PSI.
13	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 2.0 GALLONS PER MINUTE AT 80 PSI.
14	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
15	HOSE BIB- PROVIDE NON REMOVABLE BACK FLOW PREVENTERS
16	LINEN CLOSET W/ 5 SHELVES (12" MIN.)
17	CLOTHES CLOSET WITH SHELF AND POLE
18	PANTRY WITH 5 SHELVES (16" MIN.)
19	22"x30" MIN. ATTIC ACCESS & 30"x30" FOR FURNACE WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. "THE ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS."
20	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
21	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED.
22	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
23	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
24	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN
25	STAIR- MIN. 10" TREAD AND 7 3/4" MAX. RISER WITH 36" CLEAR WIDTH PER DET. 1/A-2
26	WOOD FLOOR SLAB- 3/4" THICK PLYWOOD SHEATHING OVER FLOOR JOIST
27	BEAM/ HEADER OUTLINE- REFER TO FLOOR/ ROOF FRAMING PLAN
28	DUCT CHASE- REFER TO MECHANICAL PLAN
29	22"x30" BI SERIES FIRE RATED ATTIC ACCESS DOOR W/ SELF CLOSER AND SELF LATCHING BY BABCOCK-DAVIS (WARNOCK-HERSEY LISTED 3 HOURS FIRE RATING IN HORIZONTAL SURFACES) OR ANY APPROVED EQUAL.

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 FOR GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality Insulation Installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- — None —

REQUIRED SPECIAL FEATURES
- PV System: 2.2 kWdc

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSAB125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.27	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR		

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL	R-13 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY WALL	R-19
ROOF W/ Radiant Barrier	R-38
ROOF @ FAU W/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 EF.
REFER TO CF1R FOR MORE DETAILS AND INFORMATION	

City of Clovis - Planning and Development Services - Building Division
Plans Approved Under the 2016 California Building Codes
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REV.	DATE	DESCRIPTION OF WORK
1		
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CLOVIS
PLAN 4024 (HARMONY)

DATE: JANUARY 17, 2019
PROJECT: CORONET SERIES

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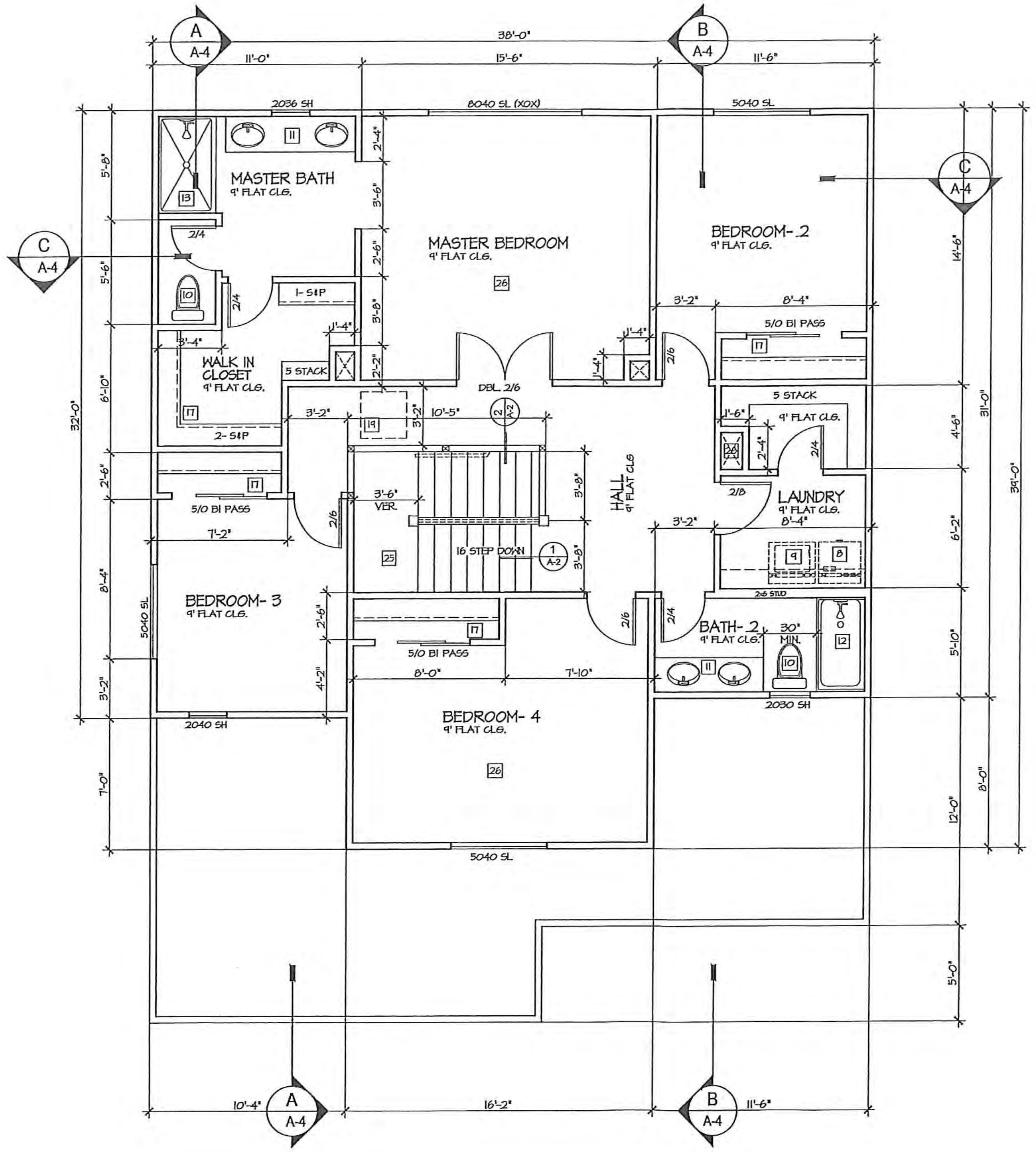
SHEET NO.
A-1
OF ___ SHEETS

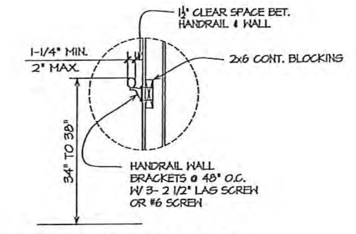
☐	FLOOR PLAN KEY NOTES:
	SEE FLOOR PLAN KEYNOTES ON SHEET A-1

NOTE:
COMPLY WITH THE REQUIREMENTS FOR WINDOW FALL PROTECTION WHERE THE OPENING OF AN OPERABLE WINDOW IS LOCATED MORE THAN 72 INCHES ABOVE THE FINISHED GRADE OR SURFACE BELOW, THE LOWEST PART OF THE OPENING OF THE WINDOW SHALL BE A MINIMUM OF 24 INCHES ABOVE THE FINISHED FLOOR OF THE ROOM IN WHICH THE WINDOW IS LOCATED.

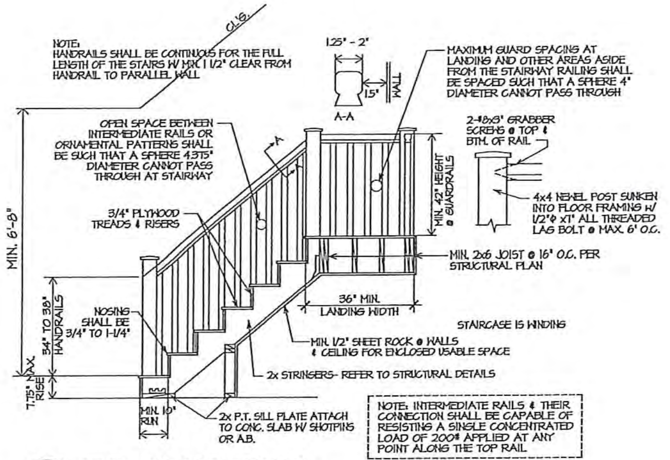


SECOND FLOOR PLAN 1,245 SQ. FT.

SCALE: 1/4" = 1'-0"



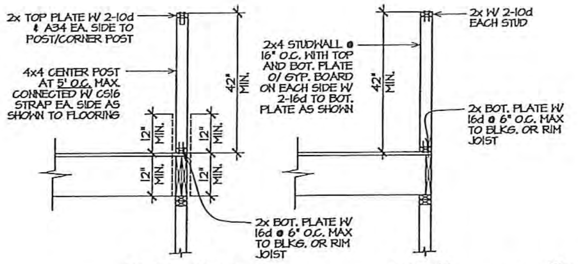
WALL MOUNT HANDRAIL



1 A-2 TYP. STAIR DETAIL

MIN. STAIR WIDTH SHALL BE 36". ALL TREADS AND RISERS SHALL HAVE MAX. 3/8" VARIANCE FROM THE LEAST TO THE GREATEST.
STAIR TREADS SHALL HAVE A RUN OF AT LEAST 10".
A NOSING IS NOT REQUIRED WHERE THE TREAD DEPTH IS A MINIMUM OF 11 INCHES.

NOTE:
A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE LARGER THAN 12'-3" BETWEEN FLOOR LEVELS OR LANDINGS PER R311.7.3



2 A-2 GUARD WALL DETAIL

INTERMEDIATE RAILS & THEIR CONNECTION SHALL BE CAPABLE OF RESISTING A SINGLE CONCENTRATED LOAD OF 200# APPLIED AT ANY POINT ALONG THE TOP RAIL

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CLOVIS
PLAN 4024 (HARMONY)

DATE	PROJECT
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SHEET NO.
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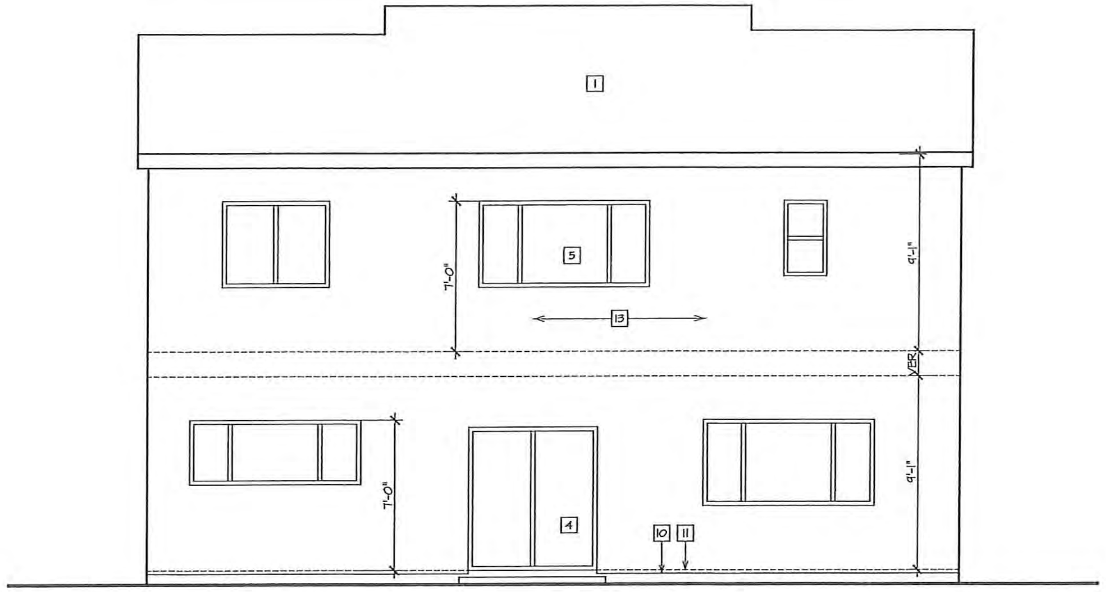


TYP. REAR ELEV.

SCALE: 1/4" = 1'-0"

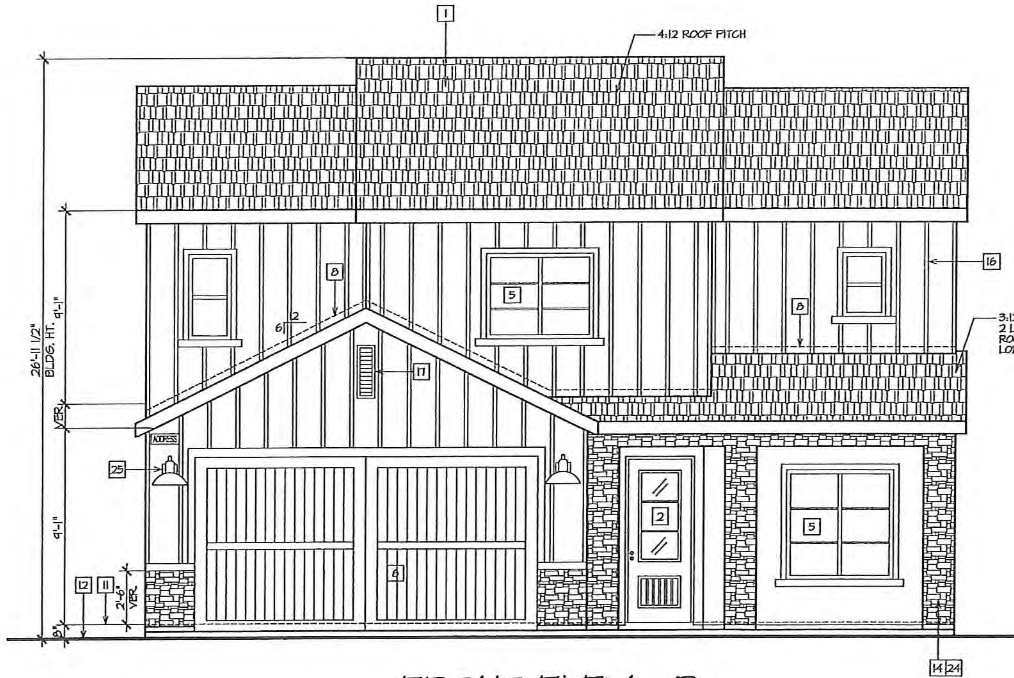
☐	ELEVATION KEYNOTES
1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT OR CONCRETE ROOF FLAT TILE (ESR-1647) O/ 30# UNDERLAYMENT O/ ROOF SHEATHING. (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-405.3.3)
2	MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL
3	EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.
4	SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR
5	WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)
6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
7	ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.
8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-4.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
13	WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR-R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.) ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL (NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)
14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
20	MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.
21	DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)
22	PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)
23	MIN. 4x4 POST WITH STUCCO FINISH
24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT
26	PROVIDE WALL STRAP TO TIE DISCONTINUOUS TOP PLATE CS16 STRAP 48" LONG W/ 2x BLOCKING

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"

FRONT ELEV.- A

SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
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CLOVIS
PLAN 4024 (HARMONY)

DATE	PROJECT
JANUARY 17, 2019	CORONET SERIES

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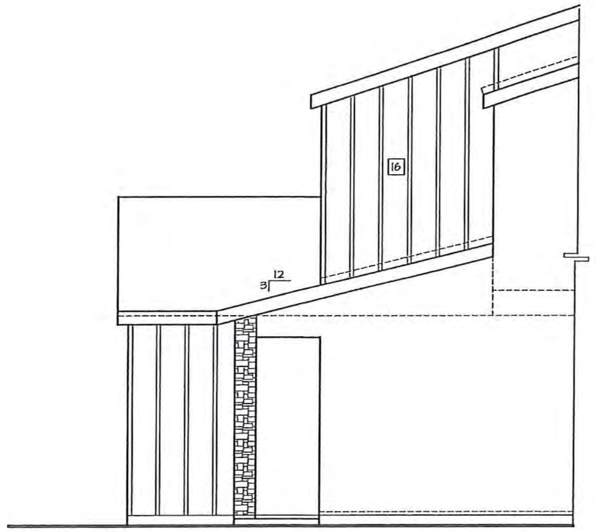
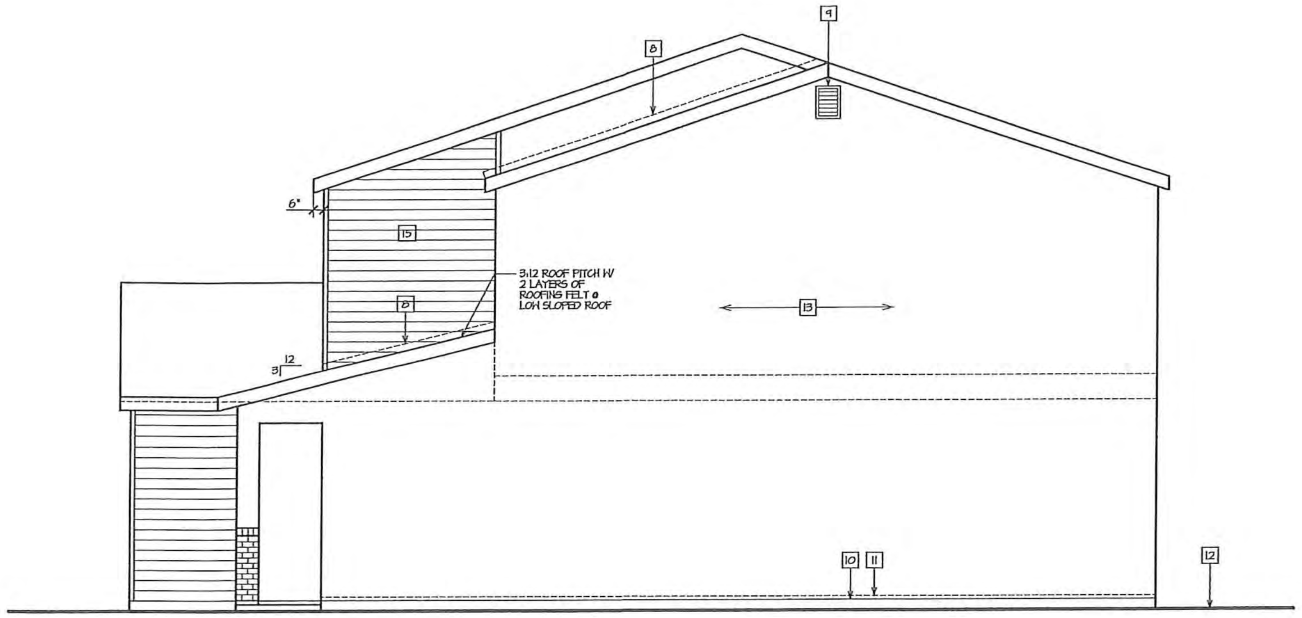
SHEET NO.
A-3
OF ___ SHEETS



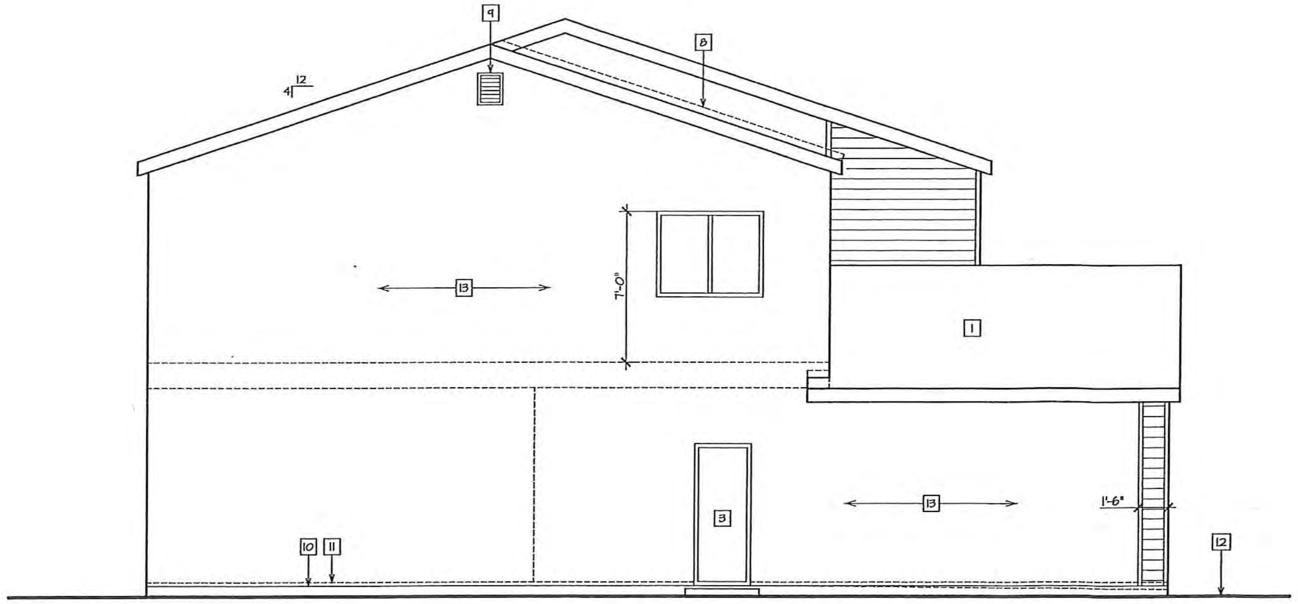
PARTIAL
RIGHT ELEV.- B
SCALE: 1/4" = 1'-0"



RIGHT ELEV.- A
SCALE: 1/4" = 1'-0"

☐	ELEVATION KEYNOTES
	SEE ELEVATION KEYNOTES ON SHEET A-3

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1310) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL
NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



LEFT ELEV.- A
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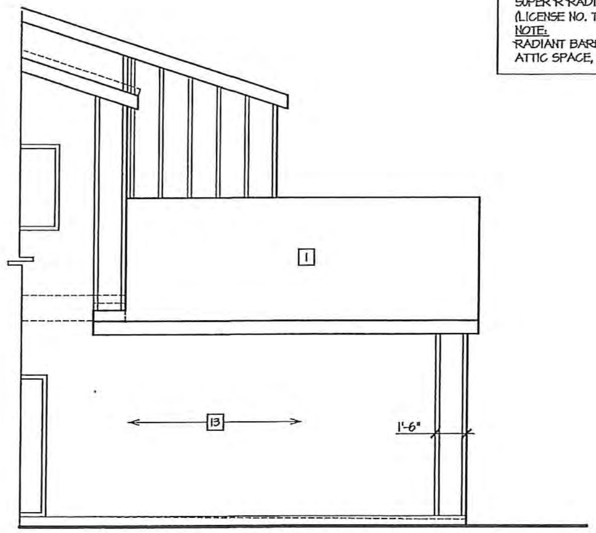

PARTIAL
LEFT ELEV.- B
SCALE: 1/4" = 1'-0"

City of Clovis - Planning and Development Services - Building Division
16SRN
OCT 28 2019

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CLOVIS
PLAN 4024 (HARMONY)

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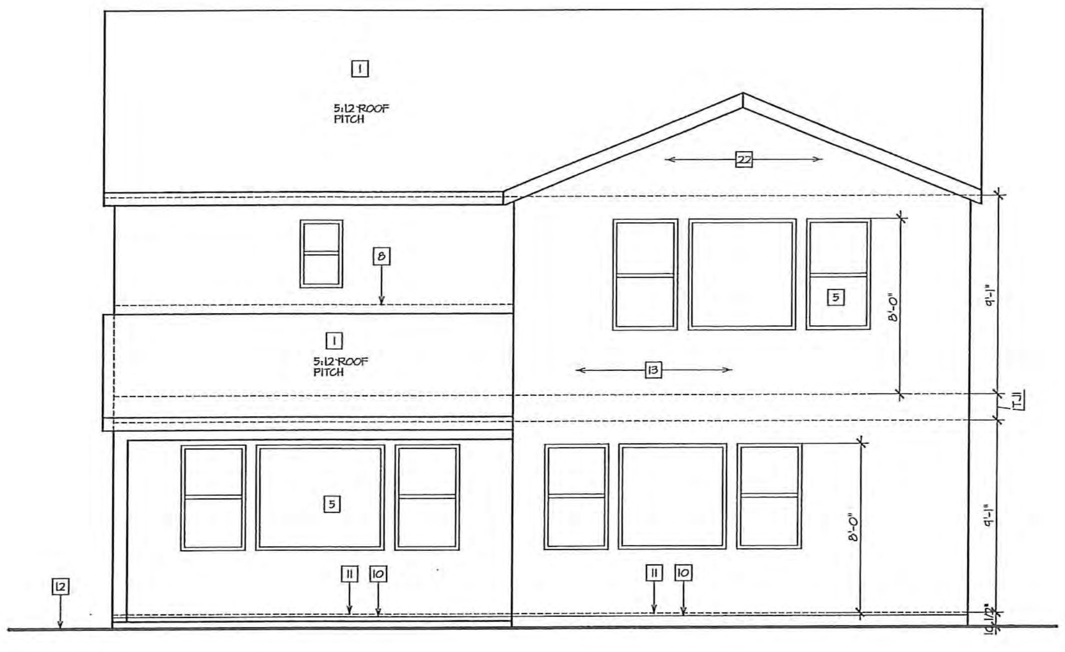

REAR ELEV.

SCALE: 3/16" = 1'-0"

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1	CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT O/ ROOF SHEATHING. (ROOF EMMITANCE IS 0.85) (NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-905.3.3)
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6	SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES
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8	PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).
9	GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.
10	TYPICAL WEEP SCREED SEE DETAIL 1/A-4.
11	FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE
12	FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.
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14	MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT
15	HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
16	BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT
17	DECORATIVE GABLE VENT ONLY PER ELEVATION
18	TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.
19	DECORATIVE SHUTTER ONLY PER ELEVATION
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24	BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH
25	WEATHER PROOF APPROVED EXTERIOR LIGHT
26	PROVIDE WALL STRAP TO TIE DISCONTINUOUS TOP PLATE CS16 STRAP 48" LONG W/ 2x BLOCKING

NOTE FOR RADIANT BARRIER:

USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1310) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

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FRONT ELEV.- A

SCALE: 1/4" = 1'-0"

FRONT ELEV.- B

SCALE: 1/4" = 1'-0"

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CLOVIS
PLAN 4025 (OVERTURE)

PROJECT
CORONET SERIES

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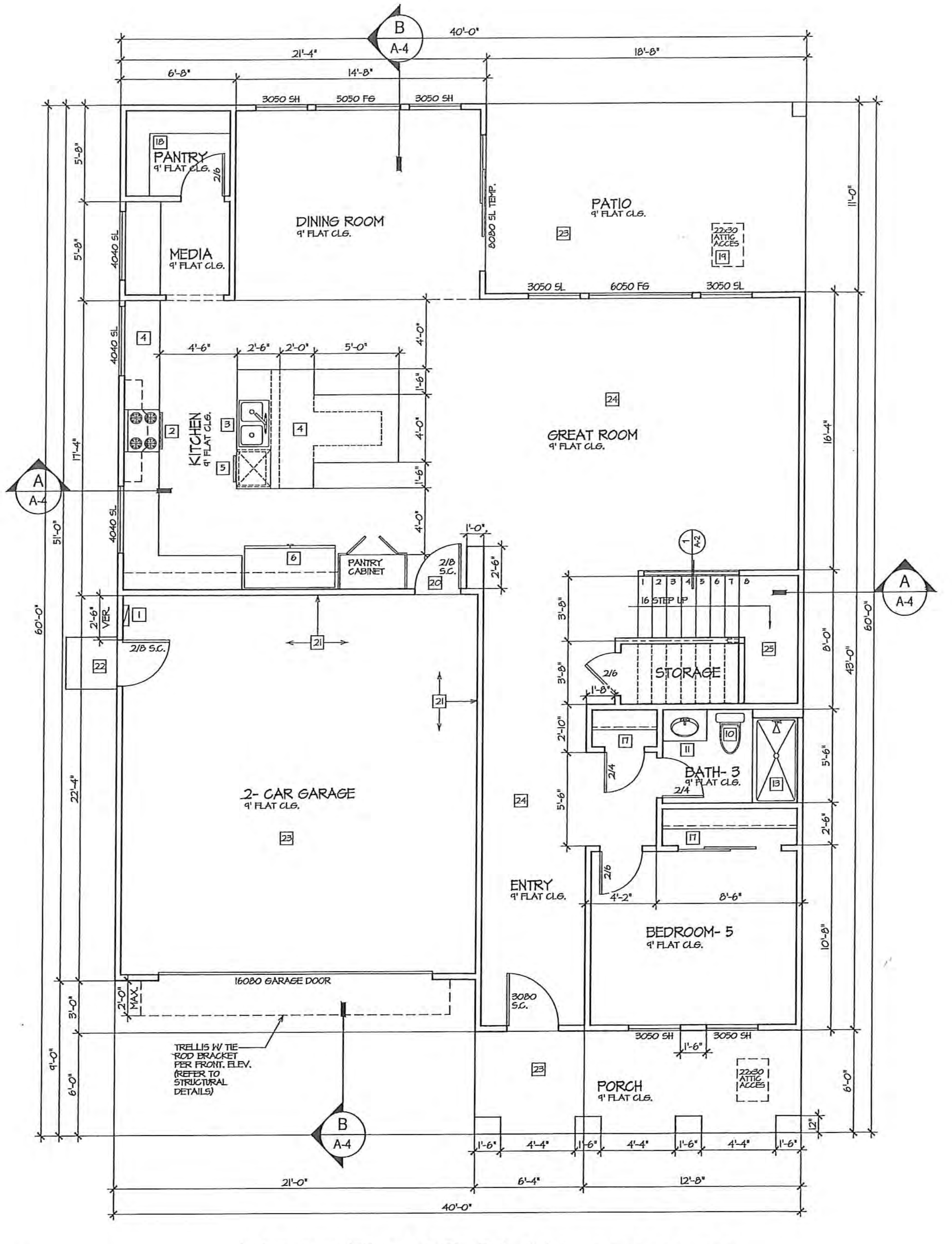

FIRST FLOOR PLAN 1,422 SQ. FT.

SCALE: 1/4" = 1'-0"

☐	FLOOR PLAN KEY NOTES:
1	INDOOR TYPE TANK-LESS WATER HEATER WITH ANTI-FREEZING CONTROLS BY RINNAI (RUC80N) OR ANY APPROVED EQUAL. ISOLATION VALVES AND HOSE BIBBS REQUIRED FOR TANK-LESS WATER HEATER. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND SPECIFICATIONS
2	FREE STANDING RANGE W/ MICRO & HOOD (VTR)-VERTICAL CLEARANCE ABOVE THE RANGE TO COMBUSTIBLES IS 30" UNPROTECTED, OR 24" PROTECTED AND THE HORIZONTAL DIMENSION IS REQUIRED TO BE PER THE PERMANENT MARKING LISTED ON THE UNIT.
3	KITCHEN SINK- KITCHEN SINK COMPARTMENT W/ GARBAGE DISPOSAL. KITCHEN FAUCETS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 60 PSI.
4	MAX. 36" HEIGHT COUNTER TOP WITH BUILT IN CABINET BELOW
5	DISHWASHER- INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6	REFRIGERATOR SPACE W/ COLD WATER STUB
7	WALL TYPE LAVATORY WITH PEDESTAL. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
8	DRYER SPACE- PROVIDE BACKDRAFT DAMPER @ VENT TERMINATION
9	WASHER SPACE- PROVIDE LISTED WATER HAMMER ARRESTOR
10	WATER CLOSET- TYP. LOW FLOW 1.28 GAL. MAX. PER FLUSH & MUST HAVE 30" WIDTH AND 24" CLEAR IN FRONT OF THE FIXTURE, AND SHALL NOT BE SET CLOSER THAN 15" FROM IT'S CENTER TO ANY SIDE WALL OR OBSTRUCTION
11	LAVATORY COUNTER TOP WITH BUILT IN CABINET BELOW. LAVATORY FAUCETS SHALL NOT EXCEED 1.2 GALLONS PER MINUTE AT 60 PSI, BUT NOT BE LESS THAN 0.8 GALLONS PER MINUTE AT 20 PSI.
12	TUB AND SHOWER- PREFAB FIBER GLASS W/ WALLS +72" MIN. AND SHOWER CURTAIN OR TEMP. SLIDING GLASS ENCLOSED. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
13	SHOWER- PREFAB. FIBER GLASS OR CUSTOM SHOWER W/ SHOWER WALLS +72" MIN. AND 24" MIN. TEMP. GLASS DOOR AND SHALL SWING OUTWARD. A MIN. AREA OF 1024 SQ. IN. REGARDLESS OF SHAPE WITH A MIN. 30" DIA. CIRCLE. SHOWERHEADS SHALL NOT EXCEED 1.8 GALLONS PER MINUTE AT 80 PSI.
14	PREFAB FIBER GLASS TUB WITH PLATFORM. MAX. HOT WATER TEMPERATURE DISCHARGING FROM TUB FILLER SHALL BE LIMITED TO 120°F.
15	HOSE BIB- PROVIDE NON REMOVABLE BACK FLOW PREVENTERS
16	LINEN CLOSET W/ 5 STACK SHELVES (12" MIN.)
17	CLOTHES CLOSET WITH SHELF AND POLE
18	PANTRY WITH 5 STACK SHELVES (16" MIN.)
19	22"x30" MIN. ATTIC ACCESS & 30"x30" FOR FURNACE WITHIN 20' MAX. ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL. THE ATTIC ACCESS DOOR SHALL HAVE PERMANENTLY ATTACHED INSULATION USING ADHESIVE OR MECHANICAL FASTENERS. THE ATTIC ACCESS OPENINGS ARE GASKETED TO PREVENT AIR LOSS.
20	1-3/8" THICK SOLID CORE DOOR. PROVIDE 3 HINGES OUT OF WHICH 2 MIN. ARE SELF CLOSING AND SELF LATCHING
21	PROVIDE 5/8" (TYPE 'X') GYP. BOARD AT ALL WALLS AND CEILING INCLUDING EXPOSED POSTS AND BEAMS BET. GARAGE AND RESIDENCE. TAPE AND FINISH AS REQUIRED.
22	CONCRETE STOOP (MIN. 3'x3') SLOPE TO DRAIN. SEE FOUNDATION PLAN
23	PORCH/PATIO/GARAGE SLAB MIN. 3-1/2" THICK W/ TOOLED OR SAW CUT CONTROL JOINT & SLOPE TO DRAIN. REFER TO FOUNDATION PLAN.
24	CONCRETE SLAB MIN. 3-1/2" THICK O/ 2" FILL SAND O/ 10 MILL VAPOR BARRIER O/ 90% COMPACTED NATIVE SOIL OR PER FOUNDATION PLAN
25	STAIR- MIN. 10" TREAD AND 7 3/4" MAX. RISER WITH 36" CLEAR WIDTH PER DET. 1/A-2
26	WOOD FLOOR - 3/4" THICK PLYWOOD SHEATHING OVER FLOOR JOIST
27	BEAM/ HEADER OUTLINE- REFER TO FLOOR/ ROOF FRAMING PLAN
28	DUCT CHASE- REFER TO MECHANICAL PLAN
29	22"x30" BI SERIES FIRE RATED ATTIC ACCESS DOOR W/ SELF CLOSER AND SELF LATCHING BY BABCOCK-DAVIS (WARNOCK-HERSEY LISTED 3 HOURS FIRE RATING IN HORIZONTAL SURFACES) OR ANY APPROVED EQUAL.

NOTE:
"SHEETROCK NAILING INSPECTION IS REQUIRED"

SEE SHEET N-1 FOR TABLE 702.3.5 FOR GYPSUM BOARD NAILING TABLE, AND TABLE 602.3.1 & 602.3.2 FOR FASTENING/NAILING SCHEDULE

SEE SHEET GB FOR 2016 GREEN BUILDING MANDATORY MEASURES:

HERS FEATURE SUMMARY PER TITLE 24 TO BE FIELD-VERIFIED BY A CERTIFIED HERS RATER:
Building-level Verifications:
- High quality Insulation Installation (QII)
- IAQ mechanical ventilation

Cooling System Verifications:
- Minimum Airflow
- Verified EER
- Verified SEER
- Refrigerant Charge
- Fan Efficacy Watts/CFM

HVAC Distribution System Verifications:
- Duct Sealing
- Low-leakage Air Handling Unit

Domestic Hot Water System Verifications:
- — None —

REQUIRED SPECIAL FEATURES
- PV System: 2.2 kWdc

FLOOR PLAN NOTES

1. DRIVEWAYS TO RESIDENTIAL GARAGES SHALL HAVE A MAX. SLOPE OF 12% FOR A MIN. DISTANCE OF 20' FROM THE GARAGE. NO PORTION OF THE DRIVEWAY SHALL EXCEED A GRADE OF 18%. NO ON-SITE WATER RETENTION. PROVIDE 6" WATER DRAINED AWAY FROM THE BUILDING FOR A MIN. OF 10. WHERE THIS REQUIREMENT CANNOT BE MET, AN ALTERNATE METHOD IS REQUIRED. NO DRAINAGE ONTO ADJACENT PROPERTY. GRADE DIFFERENTIALS GREATER THAN 12" SHALL BE DONE BY AN APPROVED RETAINING WALL.
2. DOORS BETWEEN THE RESIDENCE AND THE PRIVATE GARAGE SHALL BE SELF-CLOSING AND SELF-LATCHING WHEN BOTH THE GARAGE AND RESIDENCE ARE PROTECTED BY AN AUTOMATIC RESIDENTIAL FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION R309.6 & R313. (CRC R302.5.1)
3. ALL PERMANENTLY INSTALLED LIGHTING FIXTURES SHALL BE HIGH-EFFICACY LUMINAIRES IN ACCORDANCE WITH TABLE 150.0-A OF THE CALIFORNIA ENERGY CODE.
4. THE ATTIC ACCESS SHALL BE WEATHER-STRIPPED AND INSULATION EQUIVALENT TO THAT OF THE CEILING SHALL BE INSTALLED ON THE ACCESS PANEL.
5. COMPLY WITH SECURITY CODE ORDINANCE:
   A) PEEP HOLE OR VISION PANEL
   B) STEEL PLATE AT THE DEAD BOLT STRIKER, SOLID SHIM 6" ABOVE & BELOW W/ 2-#8 x 2" SCREWS.
   C) WINDOWS TO MEET THE MIN. STANDARDS AS ESTABLISHED BY THE CBC STDS.
   D) DEAD BOLT AT ALL EXTERIOR DOORS
6. PROVIDE LISTED WATER HAMMER ARRESTORS TO SERVE THE DISHWASHER, ICE MAKER, WASHING MACHINE AND LANDSCAPE IRRIGATION AUTOMATIC VALVE MANIFOLD. DEVICES SHALL BE CONCEALED WITHIN WALLS OR ATTIC (EXCEPT LANDSCAPE IRRIGATION DEVICE)
7. AIR CONDITIONING EQUIPMENT DESIGNED TO BE IN A FIXED POSITION SHALL BE SECURELY FASTENED.
8. GAS VENTS TO TERMINATE NOT LESS THAN 4' FROM OPENINGS OR PROPERTY LINES AND NOT LESS THAN 12" ABOVE A DOOR, OPENABLE WINDOW OR GRAVITY AIR INLET.
9. DOOR LANDING NOTES:
   A. WIDTH NOT LESS THAN THE WIDTH OF DOOR SERVED AND A LENGTH IN THE DIRECTION OF TRAVEL NOT LESS THAN 36".
   B. NO MORE THAN 1½" LOWER THAN THE TOP OF THE THRESHOLD.
   C. NOT MORE THAN 7¾" BELOW THE TOP OF THE THRESHOLD PROVIDED THAT THE DOOR DOES NOT SWING OVER THE LANDING OR FLOOR.
   D. MINIMUM NET HEIGHT OF THE REQUIRED EGRESS DOOR TO BE NOT LESS THAN 78" MEASURED FROM THE TOP OF THRESHOLD TO THE BOTTOM OF THE DOOR STOP.
10. ALL TUB-SHOWER OPENINGS SHALL BE RODENT PROOF, W/ 1" CEMENT COVERING IN AN APPROVED MANNER.
11. THE WALL SURFACE BEHIND CERAMIC TILE OR OTHER FINISH WALL MATERIALS SUBJECT TO WATER SPLASH ARE CONSTRUCTED OF MATERIALS NOT ADVERSELY AFFECTED BY WATER. USE FIBER-CEMENT, FIBER-MAT REINFORCED CEMENT OR GLASS MAT GYPSUM BACKERS. WATER RESISTANT GYPSUM BOARD IS NO LONGER PERMITTED TO BE USED IN THESE LOCATIONS.
12. MAXIMUM SILL HEIGHT TO NET WINDOW OPENING OF 44-INCHES ABOVE THE FINISHED FLOOR FOR ALL THE WINDOWS USED FOR EMERGENCY EXIT WITH MIN. 20"W AND 24"H OPENING WITH A MIN. OPEN AREA OF 5.7 SQ. FT.
13. THE MAXIMUM HOT WATER TEMPERATURE DISCHARGE SHALL BE LIMITED FOR THE FOLLOWING:
   A. BATHTUBS AND WHIRLPOOL BATHTUBS SHALL BE LIMITED TO 120°F BY A DEVICE THAT CONFORMS TO ASSE 1070 OR CSA B125.3. (CPC SECTION 409.4) (THE WATER HEATER THERMOSTAT SHALL NOT BE CONSIDERED A CONTROL FOR MEETING THIS PROVISION.)
   B. SHOWERS AND TUB/SHOWER COMBINATION SHALL BE PROVIDED WITH INDIVIDUAL CONTROL VALVES OF THE PRESSURE BALANCE, THERMOSTATIC, OR COMBINATION PRESSURE BALANCE/THERMOSTATIC MIXING VALVES TYPE THAT PROVIDE SCALD AND THERMAL SHOCK PROTECTION FOR THE RATED FLOW RATE OF THE INSTALLED SHOWERHEAD. THESE VALVES SHALL BE INSTALLED AT THE POINT OF USE AND IN ACCORDANCE WITH ASSE 1016 OR ASME A112.18.1/CSA B125.1 (CPC SECTION 408.3)
14. ALL HOSE BIBS SHALL BE EQUIPPED WITH NON-REMOVABLE BACK FLOW PREVENTERS.
15. ALL PLUMBING CONVEYING OR DISPENSING WATER FROM HUMAN CONSUMPTION SHALL COMPLY WITH AB 1953 FOR LEAD CONTENT NOT TO EXCEED 0.25%.
16. THE T AND P RELIEF VALVE HAVING A FULL SIZED DRAIN OF GALV. STEEL OF HARD DRAWN COPPER TO THE OUTSIDE OF THE BLDG. WITH THE END OF PIPE NOT MORE THA 2' OR LESS THAN 6" ABOVE THE GRADE, POINTING DOWNWARD, THE TERMINAL END BEING UNTHREADED.
17. ALL HABITABLE ROOMS SHALL HAVE AN AGGREGATE GLAZING AREA OF NOT LESS THAN 8% OF THE FLOOR AREA OF SUCH ROOMS FOR NATURAL LIGHT. THE MINIMUM OPENABLE AREA TO THE OUTDOORS SHALL BE 4% OF THE FLOOR AREA BEING VENTILATED. (CRC R303.1)
18. BATHROOMS, WATER CLOSET COMPARTMENTS AND OTHER SIMILAR ROOMS SHALL BE PROVIDED WITH AGGREGATE GLAZING AREA IN WINDOWS OF NOT LESS THAN 3 SQUARE FEET, ONE HALF OF WHICH MUST BE OPENABLE. GLAZED AREAS NOT REQUIRED WHERE ARTIFICIAL LIGHT AND MECHANICAL VENTILATION ARE PROVIDED. (CRC R303.3)
19. GARAGE FLOOR USED FOR THE PARKING OF AUTOMOBILES OR OTHER VEHICLES SHALL BE SLOPED TO FACILITATE THE MOVEMENT OF LIQUIDS TO A DRAIN OR TOWARD THE MAIN VEHICLE ENTRY DOOR. (CRC R309.1)
20. WHEN AN OCCUPIABLE SPACE ADJOINS A GARAGE, THE DESIGN MUST PREVENT MIGRATION OF CONTAMINANTS TO THE ADJOINING OCCUPIABLE SPACE. DOORS BETWEEN THE OCCUPIABLE SPACE AND THE GARAGE SHALL BE GASKETED OR MADE SUBSTANTIALLY AIRTIGHT WITH WEATHER STRIPPING.
21. MECHANICAL SYSTEMS INCLUDING HEATING AND AIR CONDITIONING SYSTEMS THAT SUPPLY AIR TO HABITABLE SPACES HALL HAVE MERV 6 FILTERS OR BETTER.

ENERGY COMPLIANCE SUMMARY

FENESTRATION

GLAZING TYPE	U-VALUE	SHGC
HORIZ. SLIDERS	0.30	0.23
SINGLE HUNG	0.30	0.23
FIX GLASS	0.27	0.25
GLASS DOORS	0.32	0.22
FRENCH DOOR		

BUILDING INSULATION

SURFACE:	R-VALUE
EXT. WALL (2X4)	R-13 W/ 1" FOAM
EXT. WALL (2X6)	R-19 W/ 1" FOAM
GARAGE INT. WALL	R-13 W/ NO FOAM
NOTE: NO FOAM AT WOOD SIDING/BRICK VENEER	
ATTIC PONY WALL	R-19
ROOF w/ Radiant Barrier	R-38
ROOF @ FAU w/ Radiant Barrier	R-30

ROOF REFLECTANCE	0.10
ROOF EMITTANCE	0.85

HVAC / WATER HEATING

COMPONENT	EFFICIENCY
FURNACE	95% AFUE
AIR CONDITIONER	16.0 SEER
AIR CONDITIONER	13.0 EER
DUCT INSULATION	R- 8.0
WATER HEATER (TANKLESS)	0.82 EF.
REFER TO CFIR FOR MORE DETAILS AND INFORMATION	

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MAR 0 3 2020

BY:......................

REV.	DATE	DESCRIPTION OF WORK
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4		
5		

CLOVIS
PLAN 4025 (OVERTURE)

DATE: JANUARY 17, 2019
PROJECT: CORONET SERIES

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SHEET NO.
A-1
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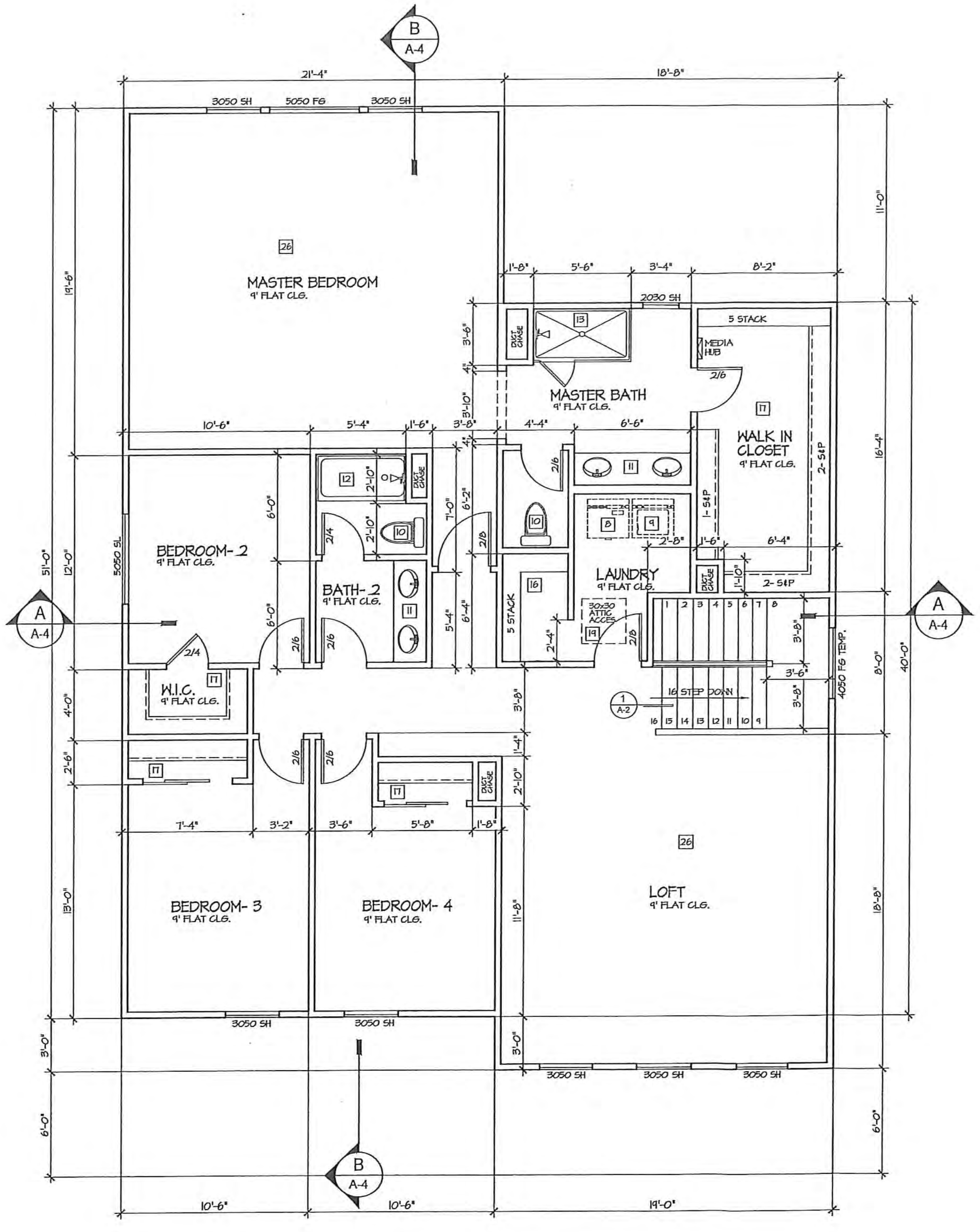
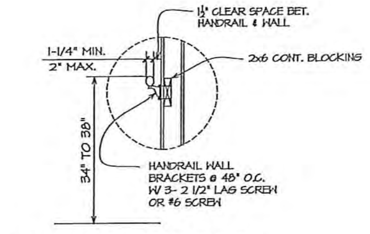
NOTE:
COMPLY WITH THE REQUIREMENTS FOR WINDOW FALL PROTECTION WHERE THE OPENING OF AN OPERABLE WINDOW IS LOCATED MORE THAN 72 INCHES ABOVE THE FINISHED GRADE OR SURFACE BELOW, THE LOWEST PART OF THE OPENING OF THE WINDOW SHALL BE A MINIMUM OF 24 INCHES ABOVE THE FINISHED FLOOR OF THE ROOM IN WHICH THE WINDOW IS LOCATED.

☐	FLOOR PLAN KEY NOTES:
	SEE FLOOR PLAN KEYNOTES ON SHEET A-1

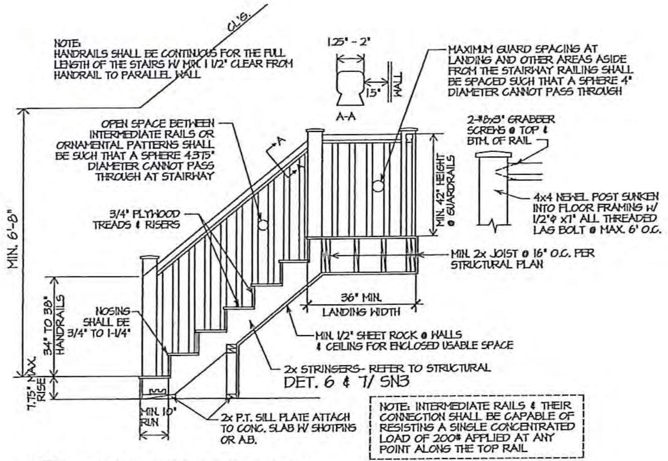


SECOND FLOOR PLAN 1,818 SQ. FT.

SCALE: 1/4" = 1'-0"



WALL MOUNT HANDRAIL



NOTE: INTERMEDIATE RAILS & THEIR CONNECTION SHALL BE CAPABLE OF RESISTING A SINGLE CONCENTRATED LOAD OF 200# APPLIED AT ANY POINT ALONG THE TOP RAIL

1 A-2 TYP. STAIR DETAIL

MIN. STAIR WIDTH SHALL BE 36". ALL TREADS AND RISERS SHALL HAVE MAX. 3/8" VARIANCE FROM THE LEAST TO THE GREATEST.
STAIR TREADS SHALL HAVE A RUN OF AT LEAST 10".
A NOSING IS NOT REQUIRED WHERE THE TREAD DEPTH IS A MINIMUM OF 11 INCHES.

NOTE:
A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE LARGER THAN 12'-3" BETWEEN FLOOR LEVELS OR LANDINGS PER R311.7.3

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SHEET NO.
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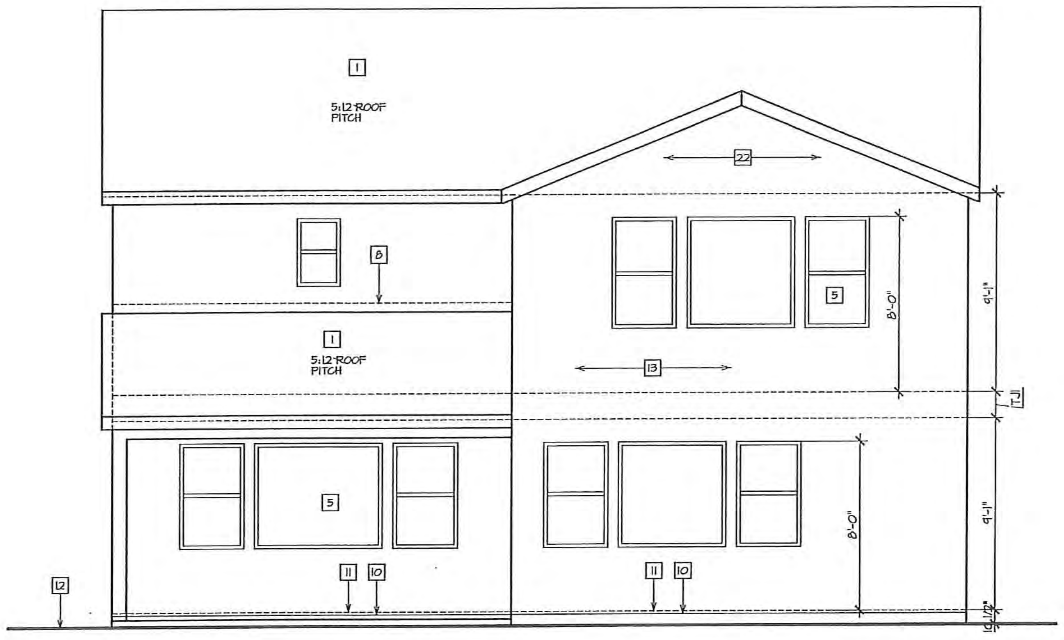


REAR ELEV.

SCALE: 3/16" = 1'-0"

ELEVATION KEYNOTES

1 CLASS 'A' ASPHALT ROOFING O/ 15# UNDERLAYMENT OR CONCRETE ROOF FLAT TILE BY BORAL ROOFING (ESR-1647) O/ 30# UNDERLAYMENT O/ ROOF SHEATHING. (ROOF EMMITANCE IS 0.85)

(NOTE: UNDERLAYMENT SHALL BE TWO LAYERS FOR SLOPE 2:12 TO 4:12 FOR ASPHALT ROOFING PER CRC-R905.2.7 AND 2.5:12 TO 4:12 FOR CONCRETE TILE ROOFING PER CRC-4053.3)

2 MAIN DOOR- 3' WIDE MIN. SOLID CORE DOOR OR TEMP. W/ PEEP HOLE OR VISION PANEL

3 EXTERIOR DOOR- SOLID CORE DOOR W/ THRESHOLD AND WEATHER STRIPPING.

4 SLIDING DOOR- TEMP. GLASS DUAL GLAZED SLIDING DOOR

5 WINDOWS- ALL WINDOWS TO BE DUAL GLAZED VINYL W/ MUNTIN AS SHOWN (FRONT ELEV. ONLY)

6 SECTIONAL GARAGE DOOR W/ AUTO. DOOR OPENER AND DECORATIVE HARDWARE. SEE FLOOR PLAN FOR SIZES

7 ILLUMINATED ADDRESS LOCATION. ADDRESS NUMBERS SHALL BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF ½ INCH.

8 PROVIDE G.I. SHEET METAL FLASHING AS REQUIRED. (SEE STANDARD FLASHING DETAILS ON SHEET FD-3).

9 GABLE END VENTS- PROVIDE MIN. 1/8" MESH SCREEN. SEE ROOF VENT CALCULATION.

10 TYPICAL WEEP SCREED SEE DETAIL 1/A-4.

11 FINISH FLOOR LINE- MIN. 8" FROM FINISH GRADE

12 FINISHED GRADE- MIN. 8" TO FINISH FLOOR WITH MIN. 2% TO 5% AWAY FROM THE BUILDING PAD.

13 WESTERN 1-COAT EXTERIOR STUCCO SYSTEM (UES-ER 382) O/ "ACH FOAM CONTROL EPS BOARD" (ESR-1006) OR "STAR R FOAM EPS" (ESR-1566) MAY BE USED IN ATTIC SPACES WITHOUT COVERING WHEN INSTALLED PER THE REQUIREMENTS OF THE ESR REPORTS. (FOAM IS REQUIRED TO BE R-4 MIN.)

ALL OTHER FOAM INSULATION BOARDS EXPOSED TO THE ATTIC SHALL BE PROTECTED W/ 1/2" SHEETROCK OR 1/4" PLYWOOD OR OTHER CODE APPROVED MATERIAL

(NOTE: 2-LAYERS OF TYPE 'D' BUILDING PAPER UNDERLAYMENT IS REQUIRED TO USE WHERE LATH IS APPLIED OVER WOOD SHEATHING)

14 MANUFACTURED STONE MASONRY BY BORAL STONE PRODUCTS (ESR 1364) OR ANY APPROVED EQUAL. INSTALL PER REQUIREMENTS AS INDICATED IN ICC-ESR REPORT

15 HARDIE PANEL SIDING PER ELEV. BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT

16 BOARD AND BATTEN SIDING PER ELEV.- WOOD PANEL SIDING BOARD BY JAMES HARDIE BUILDING PRODUCTS INC. OR EQUAL (ESR-1844) W/ MIN. 1x2 BATTEN @ 16" O.C. OVER 60# BUILDING PAPER. INSTALL PER INSTALLATION AS INDICATED IN THE ICC-ESR REPORT

17 DECORATIVE GABLE VENT ONLY PER ELEVATION

18 TRIM OR BAND PER ELEVATION- 2x WOOD TRIM FOR WOOD SIDING WALL & STUCCO FOAM TRIM FOR STUCCO WALL AND MASONRY VENEER WALL, U.N.O.

19 DECORATIVE SHUTTER ONLY PER ELEVATION

20 MIN. 2x6 HEMLOCK CONT. FASCIA BOARD TYP. AT GABLE END AND EAVES.

21 DECORATIVE METAL GUTTER PER ELEVATION WITH DOWNSPOUT-NOT SHOWN (OPTIONAL)

22 PROVIDE RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS (TYP.)

23 MIN. 4x4 POST WITH STUCCO FINISH

24 BOXED COLUMN W/ 2-2x OR 4x POST- SEE ELEVATION FOR FINISH

25 WEATHER PROOF APPROVED EXTERIOR LIGHT

26 PROVIDE WALL STRAP TO TIE DISCONTINUOUS TOP PLATE CS16 STRAP 48" LONG W/ 2x BLOCKING

NOTE FOR RADIANT BARRIER:

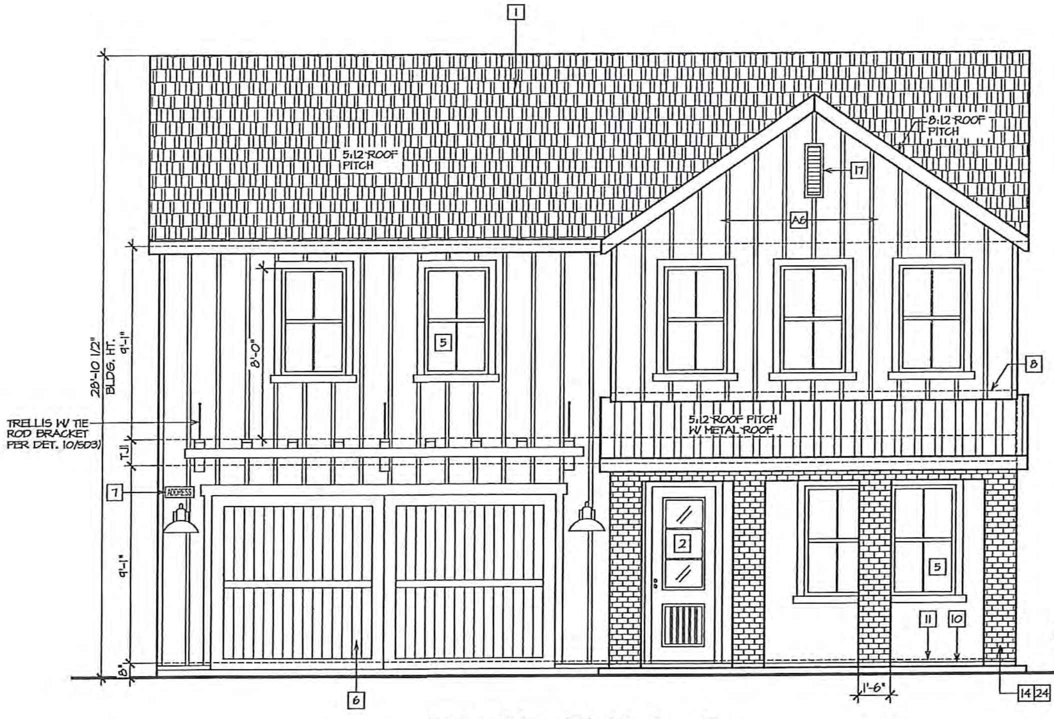
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL

NOTE:

RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.

FRONT ELEV.- A

SCALE: 1/4" = 1'-0"



FRONT ELEV.- B

SCALE: 1/4" = 1'-0"

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CLOVIS
PLAN 4025 (OVERTURE)

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SHEET NO.
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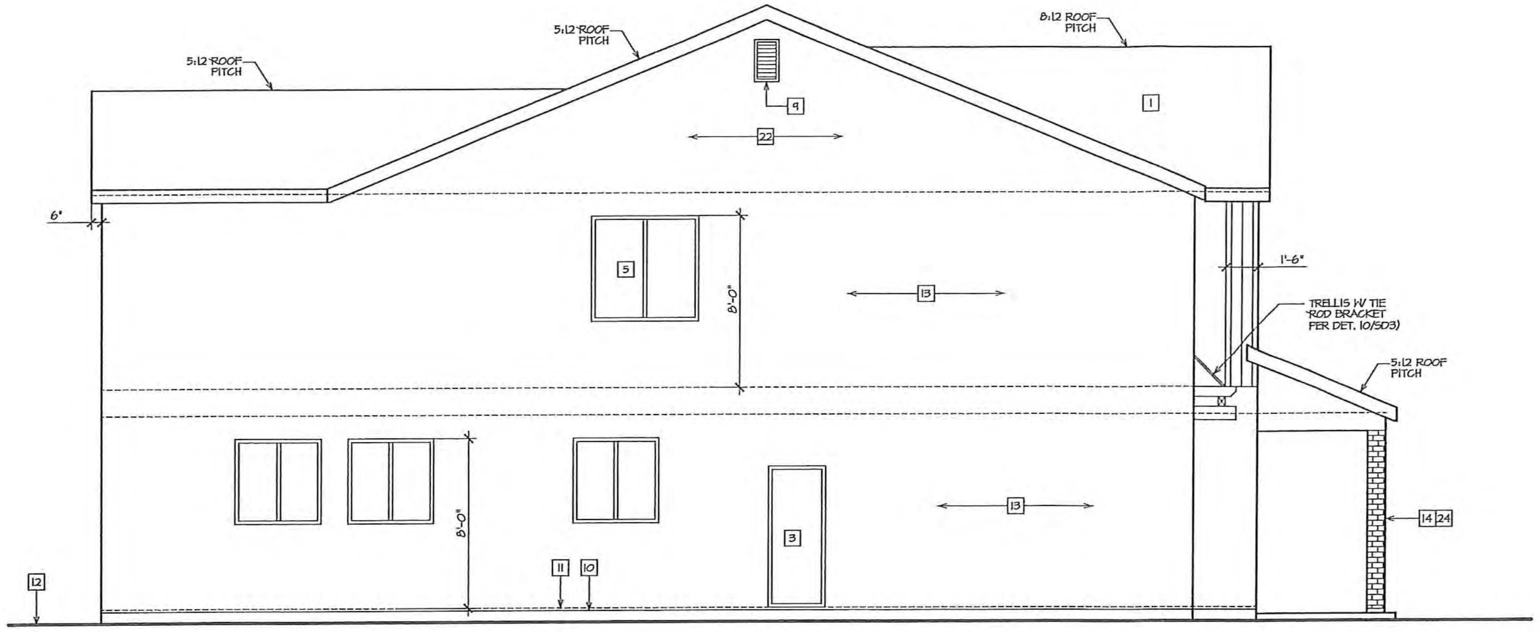
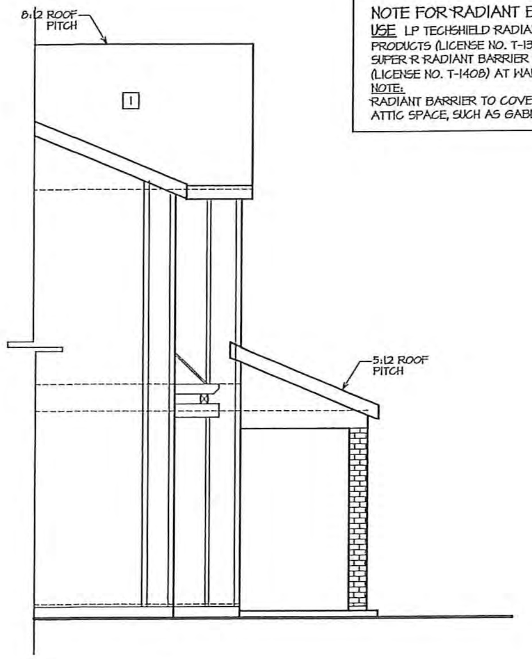
☐	ELEVATION KEYNOTES
	SEE ELEVATION KEYNOTES ON SHEET A-3

NOTE FOR RADIANT BARRIER:
USE LP TECHSHIELD RADIANT BARRIER BY LP BUILDING PRODUCTS (LICENSE NO. T-1370) AT ROOF SHEATHING AND SUPER R RADIANT BARRIER BY INNOVATIVE INSULATION INC. (LICENSE NO. T-1408) AT WALLS OR ANY APPROVED EQUAL
NOTE:
RADIANT BARRIER TO COVER ALL VERTICAL SURFACES OF ATTIC SPACE, SUCH AS GABLE END WALLS.



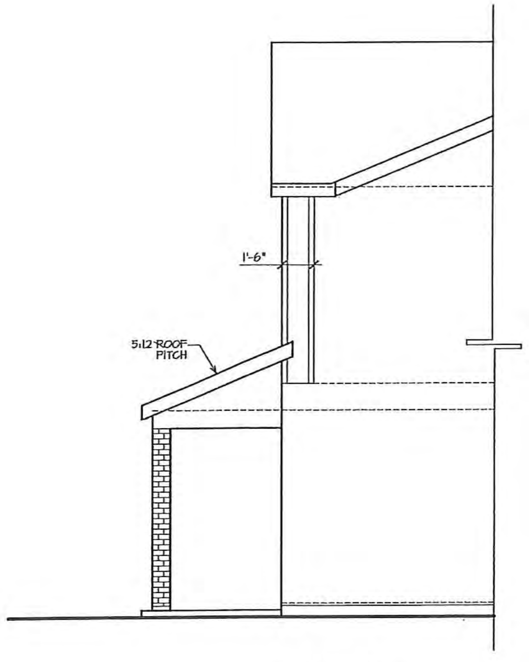
LEFT ELEV.- A

SCALE: 1/4" = 1'-0"



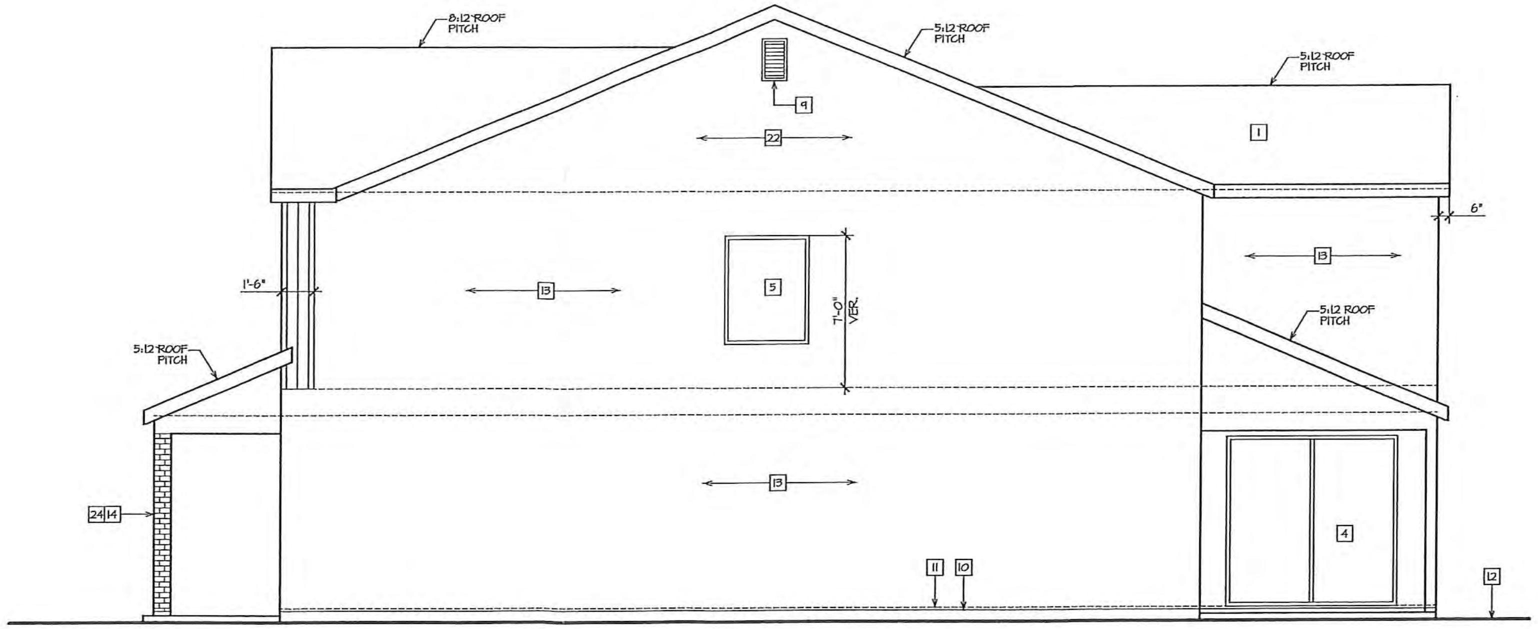
PARTIAL
LEFT ELEV.- B

SCALE: 1/4" = 1'-0"



PARTIAL
RIGHT ELEV.- B

SCALE: 1/4" = 1'-0"



RIGHT ELEV.- A

SCALE: 1/4" = 1'-0"

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SHEET NO.
A-3.1
OF ___ SHEETS

City of
LEMOORE
CALIFORNIA

711 W. Cinnamon Drive • Lemoore, California 93245 • Planning (559) 924-6744
Community Development Department

Major Site Plan Review 2020-01

To: **Lennar Homes**

From: **Steve Brandt, City Planner**

Date: **April 17, 2020**

Subject: **Major Site Plan Review No. 2020-01:** a request to approve the site plan of the project including a 362-lot subdivision, 1.1-acre park, adjacent street construction or widening of portions of Bush Street, College Avenue, the new alignment of Semas Avenue, and the new alignment of Pedersen Street. The site is located on the southeast corner of Bush Street and College Avenue (APNs 023-480-031 and 023-510-040).

1st Submittal

The site plan is approved with the corrections identified in the attached comments. Corrections can be made on the final map.

Zoning/General Plan:

The applicant is submitting a general plan amendment and zoning map amendment in conjunction with the subdivision map application.

Environmental Review:

A mitigated negative declaration has been prepared and is currently undergoing its 30-day public review.

Time Limits:

Unless a condition of approval establishes a different time limit, this permit, if not exercised within two (2) years of approval, shall expire and become void, except where an extension of time is approved in compliance with Lemoore Municipal Code Section 9-2A-9 subsection C, "Permit Extensions". The exercise of a permit occurs when the applicant or property owner has performed substantial work and incurred substantial liabilities in good faith reliance upon such permit(s). Approval of the tentative map will align the tentative map expiration date with this major site plan review.

Attached Comments:

Comments regarding Planning

Comments regarding Engineering

Comments regarding Traffic

Map markups from Engineering

Map markups from Public Works

City of Lemoore
Planning Department
Site Plan Review Comments

DATE: April 17, 2020
SITE PLAN NO: Major Site Plan No. 2020-01
PROJECT TITLE: Lennar Tract 848
DESCRIPTION: 362-lot subdivision
APPLICANT: Lennar Homes
PROPERTY OWNER: Patrick Richhiuti
LOCATION: Southeast corner of Bush Street and College Avenue
APN(S): 023-480-031, 023-510-040

PLANNING DEPARTMENT

Planning/Zoning - The following comments are applicable when checked. Comments in *italics* are specific to the project.

☒ General Plan Land Use Element land use designation(s): *EXISTING: Mixed Use, Parks & Recreation, Low Density Single Family Residential, Low-Medium Density Residential. PROPOSED: Parks & Recreation, Low Density Single Family Residential, Low-Medium Density Residential, Medium Density Multi-Family Residential, Neighborhood Commercial*

☒ General Plan Circulation Element adjacent street(s): *Bush Street, College Avenue, Pedersen Street, Semas Avenue are Arterial Streets.*

☒ Zoning designation: *EXISTING: Mixed Use (MU), Parks and Recreation/Ponding Basin (PR), Low Density Residential (RLD), Low-Medium Density Residential RLMD). PROPOSED: Parks & Recreation/Ponding Basin (PR), Low Density Residential (RLD), Low-Medium Density Residential (RLMD), Neighborhood Commercial (NC).*

☒ Proposed land use: *362-lot subdivision with 1.1-acre park*

☒ Allowed use ☐ Not allowed use ☐ Requires a conditional use permit

☒ Setbacks and heights: *A PUD has been proposed that will include modified setbacks. The proposed modified setbacks are shown in the 'Proposed' column.*

	Required (minimum)	Proposed (minimum)	
Front	*18 feet to living space,* *20 feet to garage*	*10 feet to living space,* *20 feet to garage*	☐ Acceptable ☐ Revise
Interior Side	*5 feet for single-story,* *10 feet for two-story*	*5 feet*	☐ Acceptable ☐ Revise
Street Side	*15 feet*	*10 feet*	☐ Acceptable ☐ Revise
Rear	*10 feet for single-story,* *15 feet for two-story*	*10 feet for single-story,* *15 feet for two-story*	☐ Acceptable ☐ Revise
Height	*35 feet maximum*	*35 feet maximum*	☐ Acceptable ☐ Revise

☒ Open Space Requirements: *5.41 acres of park space is required to be dedicate and constructed, based on the formula in Section 8-7N-3 of the Municipal Code. If 3.2 acres of the gas pipeline area is landscaped along with the 1.1-acre park, then the difference of 1.01 acres can be paid as an in lieu fee.*

☒ Off-street Parking required: *2 spaces per lot*

☒ Parking: ☒ Minimum Parking is met. ☐ Parking is needed.

☒ Outdoor lighting: *Required per City streetlight standards.*

General Lighting Requirements: The requirements listed below shall apply to all outdoor lighting:

- *Nuisance Prevention: All outdoor lighting shall be designed, located, installed, and maintained in order to prevent glare, light trespass, and light pollution.*
- *Shielding: Except as otherwise exempt, all outdoor lighting shall be recessed and/or constructed with full downward shielding in order to reduce light and glare impacts on trespass to adjoining properties and public rights of way. Each fixture shall be directed downward and away from adjoining properties and public rights of way, so that no light fixture directly illuminates an area outside of the project site.*
- *Level of Illumination: Outdoor lighting shall be designed to illuminate at the minimum level necessary for safety and security and to avoid harsh contrasts in lighting levels between the project site and adjacent properties.*
- *Maximum Height of Freestanding Outdoor Light Fixtures: The maximum height of freestanding outdoor light fixtures less than ten feet (10') from a property line abutting residential development shall be eighteen feet (18'). Otherwise, the maximum height for freestanding outdoor light structures shall be twenty-four feet (24'). Height shall be measured from the finish grade, inclusive of the pedestal, to the top of the fixture. The designated approving authority may allow greater heights upon finding that there are special circumstances that affect the feasibility of meeting this standard.*
- *Energy Efficient Fixtures Required: Outdoor lighting shall utilize energy efficient fixtures and lamps, such as high-pressure sodium, metal halide, low pressure sodium, hard wired compact fluorescent, or other lighting technology that is of equal or greater efficiency. All new outdoor lighting fixtures shall be energy efficient with a rated average bulb life of not less than ten thousand (10,000) hours.*
- *Accent Lighting: Architectural features may be illuminated by uplighting, provided that the lamps are low intensity to produce a subtle lighting effect and no glare or light trespass is produced. Wherever feasible, solar powered fixtures should be used.*

☒ Elevations: ☐ Approved ☐ Revise and resubmit *Home plan elevations will be recommended for approval with the condition that front façade details be wrapped around to the portion of the street side of the home that is visible from the street (i.e. in front of the fence).*

☒ Fences, walls, and hedges: ☒ Approved ☐ Revise and resubmit

Block walls shall be constructed around the perimeter of the site along the arterial streets.

☐ Screening: ☐ Acceptable ☐ Revise and resubmit

☒ Landscaping: ☒ Acceptable ☐ Revise and resubmit.

Landscape Plans shall be submitted with the subdivision improvement plans and checked for compliance with MWELO, including but not limited to the following conditions:

- *Plan shall include square footages of landscaped area shown, water use calculations, and the material to be utilized.*
- *Water use classifications shall be based on WUCOLS IV.*
- *All other landscaped areas shown as landscaped shall be landscaped.*
- *Landscaping shall meet all other applicable requirements of Title 9, Article D1 of the Zoning Ordinance.*

☒ Street trees are required.

☐ Existing address must be changed to be consistent with City address.

Entitlements

☒ Major Site Plan Review is required for this project.

☐ A Use Permit is required for this project.

☐ A Zone Variance is required for this project.

City of Lemoore
Planning Department
Site Plan Review Comments

DATE:	April 17, 2020
SITE PLAN NO:	Major Site Plan No. 2020-01
PROJECT TITLE:	Lennar Tract 848
DESCRIPTION:	362-lot subdivision
APPLICANT:	Lennar Homes
PROPERTY OWNER:	Patrick Richhiuti
LOCATION:	Southeast corner of Bush Street and College Avenue
APN(S):	023-480-031, 023-510-040

☒ A Tentative Subdivision Map is required for this project.

☐ A Tentative Parcel Map is required for this project.

☐ A Lot Line Adjustment is required for this project.

☒ A Zone Map Amendment is required for this project.

☒ A General Plan Amendment is required for this project.

☒ Other discretionary action required for this project: *Planned Unit Development Permit to establish alternate building setback standards*

Environmental Technical Documents

☒ Air Impact Analysis required.

☐ Acoustical Analysis required.

☒ Biologic survey required.

☒ Cultural Records Search required.

☒ Traffic Impact Assessment required.

☐ Vehicle Trip Generation Estimates required.

☐ Covenant required.

All required technical documents have been submitted.

☐ Additional comments:

City of Lemoore
Public Works / City Engineering
Site Plan Review Comments

DATE: April 8, 2020
SITE PLAN NO: Tract 848
PROJECT TITLE: Lennar Subdivision
DESCRIPTION: Single Family Residential Tract
APPLICANT: Lennar Homes of California, Inc.
PROPERTY OWNER: Pat Ricchuti
LOCATION: Southeast corner of Bush Street and College Avenue
APN(S):

The following comments are applicable when checked:

☒ Submit improvement plans detailing all proposed work

☒ Bonds, certificate of insurance, cash payment of fees/inspection, and approved map and plan required prior to approval of Final Map.

☒ The Final Map and Improvements shall conform to the Subdivision Map Act, the City of Lemoore's Subdivision Ordinance and Standard Improvements.

☒ A preconstruction conference is required prior to the start of any construction.

☒ Right-of-way dedication required. A title report is required for verification of ownership ☒ by map ☐ by deed.

☒ City encroachment permit required which shall include an approved traffic control plan.

☐ Caltrans encroachment permit required.

☒ Caltrans comments required prior to tentative parcel map approval.

☒ Landscape and Lighting Maintenance District (LLMD) and Public Facilities Maintenance District (PFMD) / Home Owners Association required prior to approval of Final Map. LLMD and PFMD will maintain common area landscaping, street lights, street trees and local streets as applicable. Submit completed LLMD and PFMD application and filing fee a minimum of 75 days before approval of Final Map.

☒ Landscape and irrigation improvement plans to be submitted for each phase. Landscape plans will need to comply with the City of Lemoore's street tree ordinance. A street tree and landscape master plan for all phases of the subdivision will need to be submitted with the initial phase to assist City staff in the formation of the landscape and lighting district.

☒ Dedicate landscape lots to the City that are to be maintained by the landscape and lighting district.

☐ Written comments required from ditch company.

☒ Sanitary Sewer master plan for the entire development shall be submitted for approval prior to approval of any portion of the system. The sewer system will need to be extended to the boundaries of the development where future connection and extension is anticipated. The sewer system will need to be sized to serve any future developments that are anticipated to connect to the system.

☒ Grading and drainage plan required. If the project is phased, then a master plan is required for the entire project area that shall include pipe network sizing and grades and street grades.
  ☒ Prepared by a registered civil engineer or project architect.
  ☒ All elevations shall be based on the City's benchmark network.
  Storm run-off from the project shall be handled as follows:
  ☒ Directed to the City's existing storm drainage system and basin. Developer shall expand the capacity of the existing basin to accommodate proposed runoff in accordance with the City Storm Drain Master Plan.
  ☐ Directed to a permanent on-site basin
  ☐ Directed to a temporary on-site basin which is required until a connection with adequate capacity is available to the City's storm drainage system. On-site basin: ______:______ maximum side slopes, perimeter fencing required, and provide access ramp to bottom for maintenance.

☐ Protect Oak trees during construction.

☒ Show adjacent property grade elevations on improvement plans. A retaining wall will be required for grade differences greater than 0.5 feet at the property line.

City of Lemoore
Public Works / City Engineering
Site Plan Review Comments

DATE: April 8, 2020
SITE PLAN NO: Tract 848
PROJECT TITLE: Lennar Subdivision
DESCRIPTION: Single Family Residential Tract
APPLICANT: Lennar Homes of California, Inc.
PROPERTY OWNER: Pat Ricchuti
LOCATION: Southeast corner of Bush Street and College Avenue
APN(S):

☒ Relocate existing utility poles and/or facilities.

☒ Underground all existing overhead utilities within the project limits. Existing overhead electrical lines over 50kV shall be exempt from undergrounding.

☒ Provide R-value tests; 2 for each interior phase & 2 on each proposed major street (Semas & Pederson)

☒ Traffic indexes per City standard ST-1

☒ All public streets within project limits and across project frontage shall be improved to their full width, subject to available right-of-way, in accordance with City policies, standards and specifications.

☒ All lots shall have separate drive approaches constructed to City Standards.

☒ Install street striping as required by the City Engineer.

☒ Install sidewalk and park strips: Per City standards C-5 & C-5A

☒ Cluster mailbox supports required at 1 per 2 lots, or use postal unit

☒ Subject to existing reimbursement agreement to reimburse prior developer.

☒ Abandon existing wells per Code; a building permit is required.

☒ Remove existing irrigation lines and dispose off-site.

☒ Remove existing leach fields and septic tanks.

☒ Fugitive dust will be controlled in accordance with the applicable rules of San Joaquin Valley Air Pollution Control District's Regulation VIII. Copies of any required permits will be provided to the City of Lemoore.

☒ The project it may be subject to the San Joaquin Valley Air Pollution Control District's Rule 9510 Indirect Source Review per the rule's applicability criteria. A copy of the approved AIA application will be provided to the City of Lemoore.

☒ If the project meets the one acre of disturbance criteria of the State's Storm Water Program, then coverage under General Permit Order 2009-0009-DWQ is required and a Storm Water Pollution Prevention Plan (SWPPP) is needed. A copy of the approved permit will be provided to the City of Lemoore.

☐ Comply with prior comments dated ________________.

☐ Resubmit with additional information.

☐ Redesign required.

Additional comments: *See comments on Page 3*

☐ No comments. Acceptable as submitted.

Authorized Signature

Date

Printed name

The following engineering and survey considerations are recommended for the subject site:

1. Provide two-way traffic on Pedersen Avenue, just east of College Avenue. Verify right of way.
2. Provide site visibility triangles per Highway Design Manual and City standards.
3. Provide water connections on College, Pederson & Bush. Install 12” water main throughout Semas Ave. Provide 12” water grid connection to College and Pederson in accordance with City Water Master Plan. Oversized water subject to reimbursement for increment of oversize in accordance with City policies.
4. Make sewer connection at College Ave and replace 12” sewer line along frontage with 15” sewer line. Oversized sewer subject to reimbursement for increment of oversize in accordance with City policies.
5. Relocate any existing active irrigation lines currently servicing other parcels.
6. Excavation of existing basin shall accommodate all storm water within the entire tract.
7. Install oversized storm drain line through tract to accommodate remainder of drainage area 1G (stub out to east) per the City’s sewer master plan. Subject to reimbursement for increment of oversize in accordance with City policies.
8. Comply with any required environmental mitigation measures.
9. Perform necessary improvements on Fox Ditch along Pederson per City Master Plan.
10. Comply with required improvements identified in the Traffic Impact Study, including paying a proportionate share of the cost of roundabout/signal/street improvements on Bush Street at Highway 41.
11. Show x-section of interface between subdivision and high pressure gas line area including the end of the proposed cul-de-sac.
12. Developer shall pay all applicable fees, including improvement and final map processing fees, inspection, impact fees, connection fees, encroachment permit, and building permit fees.

Tentative Map:

1. Identify boundary lines and provide Assessor’s information.
2. Show flood zone on the map.
3. Local Streets to be 60’ right of way with 40’ street width.
4. Show all on-site easements, if any, and identify any to be abandoned.
5. Show proposed street names.

City of Lemoore
Public Works / City Engineering
Site Plan Review Comments

DATE: April 8, 2020
SITE PLAN NO: Tract 848
PROJECT TITLE: Lennar Subdivision
DESCRIPTION: Single Family Residential Tract
APPLICANT: Lennar Homes of California, Inc.
PROPERTY OWNER: Pat Ricchuti
LOCATION: NEC of College & Pederson
APN(S):

The following comments are applicable when checked:

☒ The City will prohibit on-street parking as deemed necessary.

☒ Install street light(s) per City of Lemoore Standards.

☒ Install street name blades at each intersection. Street names to be modified to the alignment of existing streets and without duplicating names.

☒ Install Stop Signs at interior roadways intersecting with: Semas, Pederson, Bush & College

☒ Construct parking per City of Lemoore Standards.

☒ Construct drive approach(es) per City of Lemoore Standards.

☐ Traffic Impact Study required.

Additional comments: *Comply with Existing Traffic Impact Study Requirements including paying proportionate share of roundabout/signal/street improvement at Bush Street and Highway 41*

☐ No comments. Acceptable as submitted.

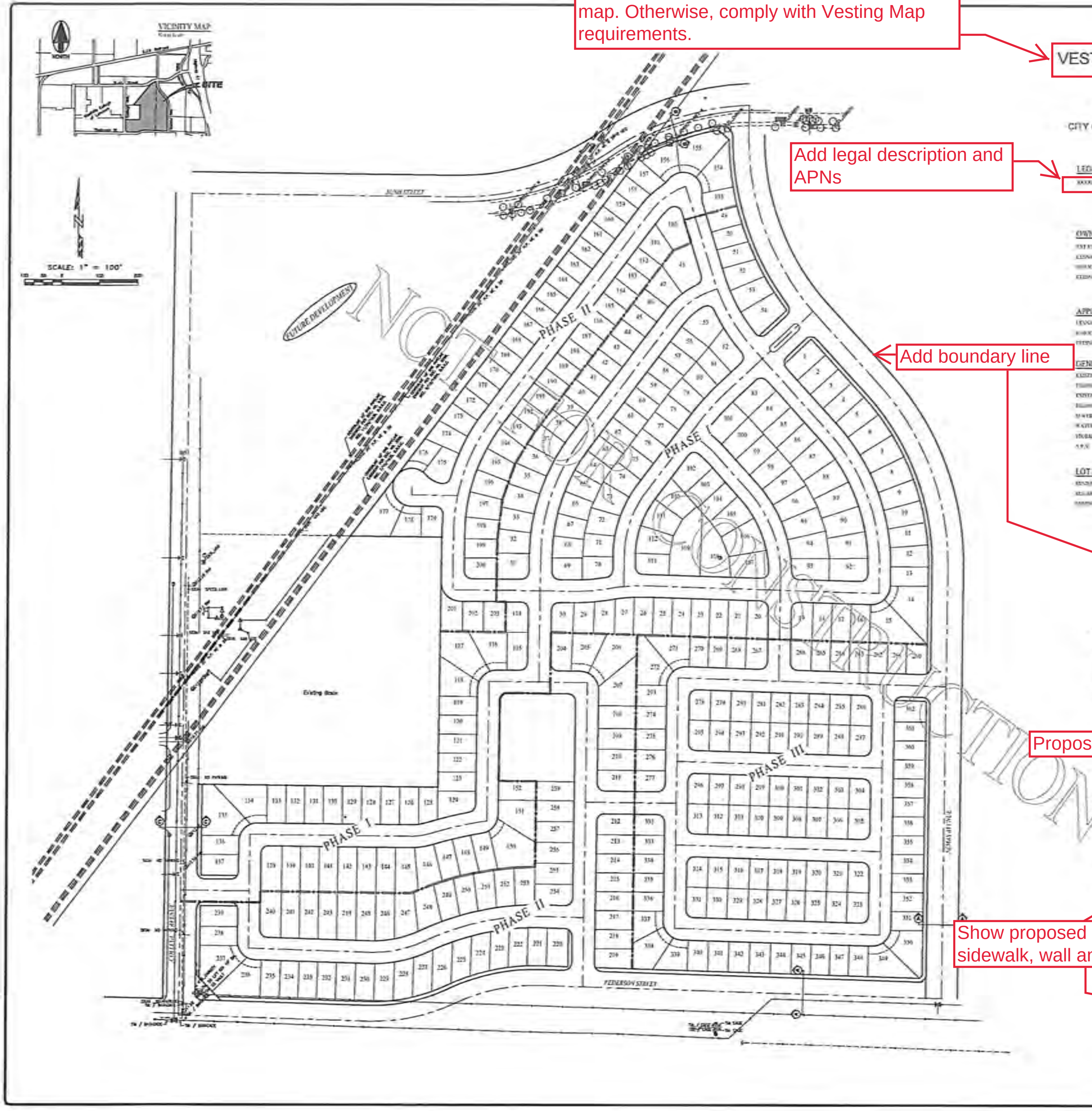
Authorized Signature

Date

Printed name

Remove "Vesting" since this not a vesting map. Otherwise, comply with Vesting Map requirements.

VESTING TENTATIVE SUBDIVISION MAP
LENNAR HOMES
COUNTY TRACT NO. 848
CITY OF LEMOORE, COUNTY OF KINGS, STATE OF CALIFORNIA



Add boundary line

Add legal description and APNs

LEGAL DESCRIPTION

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

OWNERS

[illegible]

APPLICANT

[illegible]

GENERAL INFORMATION

[illegible]

Add Flood Zone info

LOT INFORMATION	PHASE I	PHASE II	PHASE III	TOTAL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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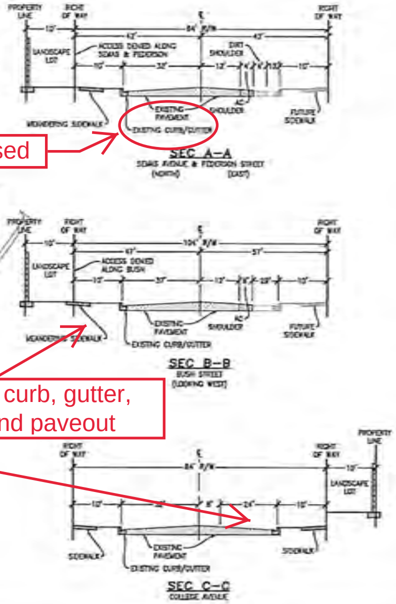
LINEWORK LEGEND

TOPOGRAPHY LEGEND



Proposed

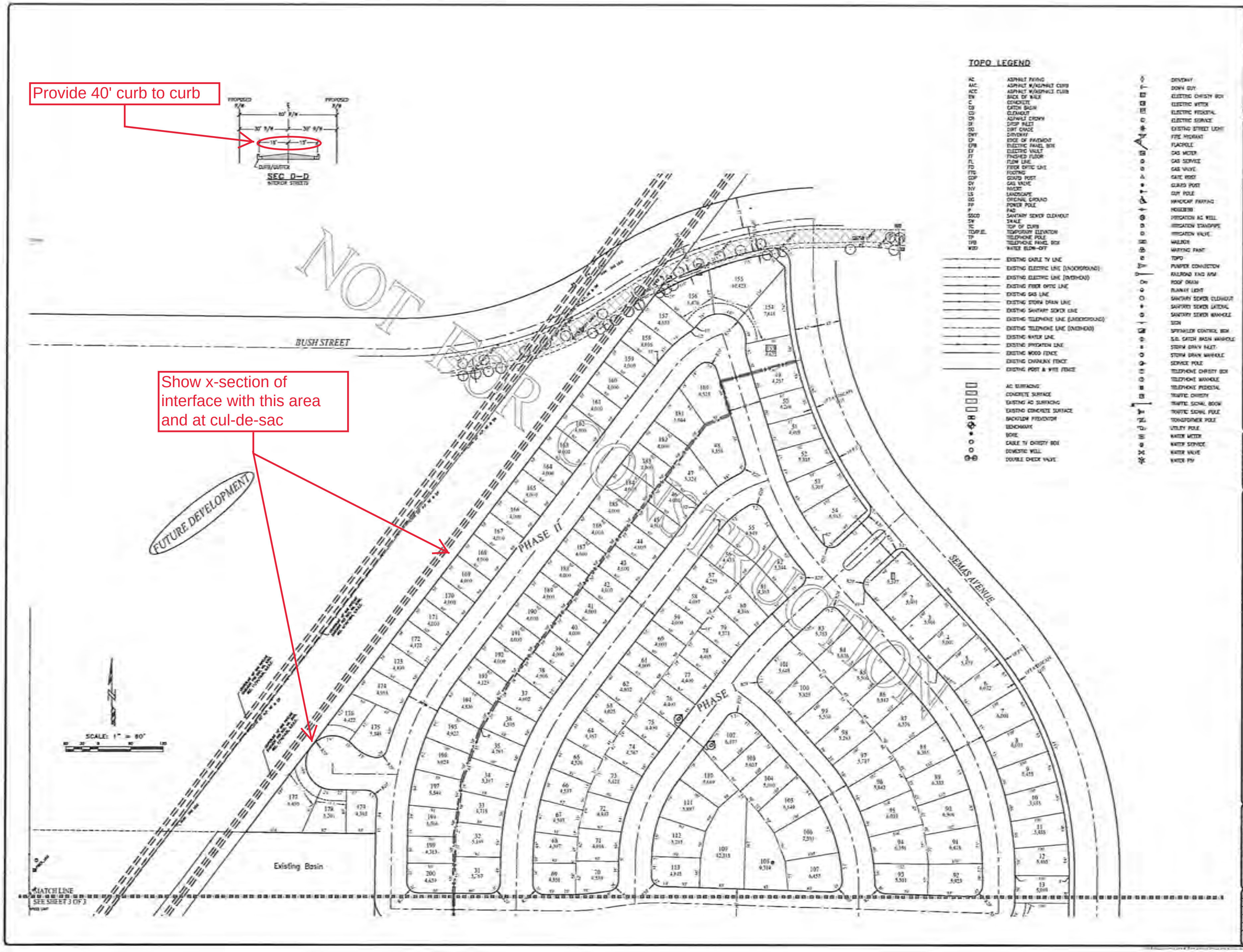
Show proposed curb, gutter, sidewalk, wall and paveout

LENNAR HOMES OF CALIFORNIA
8080 N. PALM AVENUE, SUITE 110
FRESNO, CA 93711

TENTATIVE SUBDIVISION MAP
FOR:
LENNAR HOMES OF CALIFORNIA INC.

CIVIL ENGINEERS
ZUMWALT HANSEN INC
LAND SURVEYORS
600 N. Irwin St.
Hanford, CA 93230
Office: (559) [illegible]
Fax: (559) [illegible]

DRAWN BY:	[illegible]
CHECKED BY:	[illegible]
INDEXED BY:	
DATE:	[illegible]
JOB NO.:	[illegible]
SHEET:	1



Provide 40' curb to curb

Show x-section of interface with this area and at cul-de-sac

TOPO LEGEND

AC	ASPHALT PAVING
AAC	ASPHALT W/ASPHALT CURB
ACC	ASPHALT W/ASPHALT CURB
BW	BACK OF WALK
C	CONCRETE
CB	CATCH BASIN
CO	CLEANOUT
CR	ASPHALT CROWN
DI	DROP INLET
DG	DIRT GRADE
DWY	DRIVEWAY
EP	EDGE OF PAVEMENT
EPB	ELECTRIC PANEL BOX
EV	ELECTRIC VAULT
FF	FINISHED FLOOR
FL	FLOW LINE
FO	FIBER OPTIC LINE
FTG	FOOTING
GDP	GUARD POST
GV	GAS VALVE
INV	INVERT
LS	LANDSCAPE
OG	ORIGINAL GROUND
PP	POWER POLE
P	PAD
SSCO	SANITARY SEWER CLEANOUT
SW	SWALE
TC	TOP OF CURB
TEMP.E.	TEMPORARY ELEVATION
TP	TELEPHONE POLE
TPB	TELEPHONE PANEL BOX
WBO	WATER BLOW-OFF

EXISTING CABLE TV LINE
EXISTING ELECTRIC LINE (UNDERGROUND)
EXISTING ELECTRIC LINE (OVERHEAD)
EXISTING FIBER OPTIC LINE
EXISTING GAS LINE
EXISTING STORM DRAIN LINE
EXISTING SANITARY SEWER LINE
EXISTING TELEPHONE LINE (UNDERGROUND)
EXISTING TELEPHONE LINE (OVERHEAD)
EXISTING WATER LINE
EXISTING IRRIGATION LINE
EXISTING WOOD FENCE
EXISTING CHAINLINK FENCE
EXISTING POST & WIRE FENCE

AC SURFACING
CONCRETE SURFACE
EXISTING AC SURFACING
EXISTING CONCRETE SURFACE
BACKFLOW PREVENTOR
BENCHMARK
BORE
CABLE TV CHRISTY BOX
DOMESTIC WELL
DOUBLE CHECK VALVE

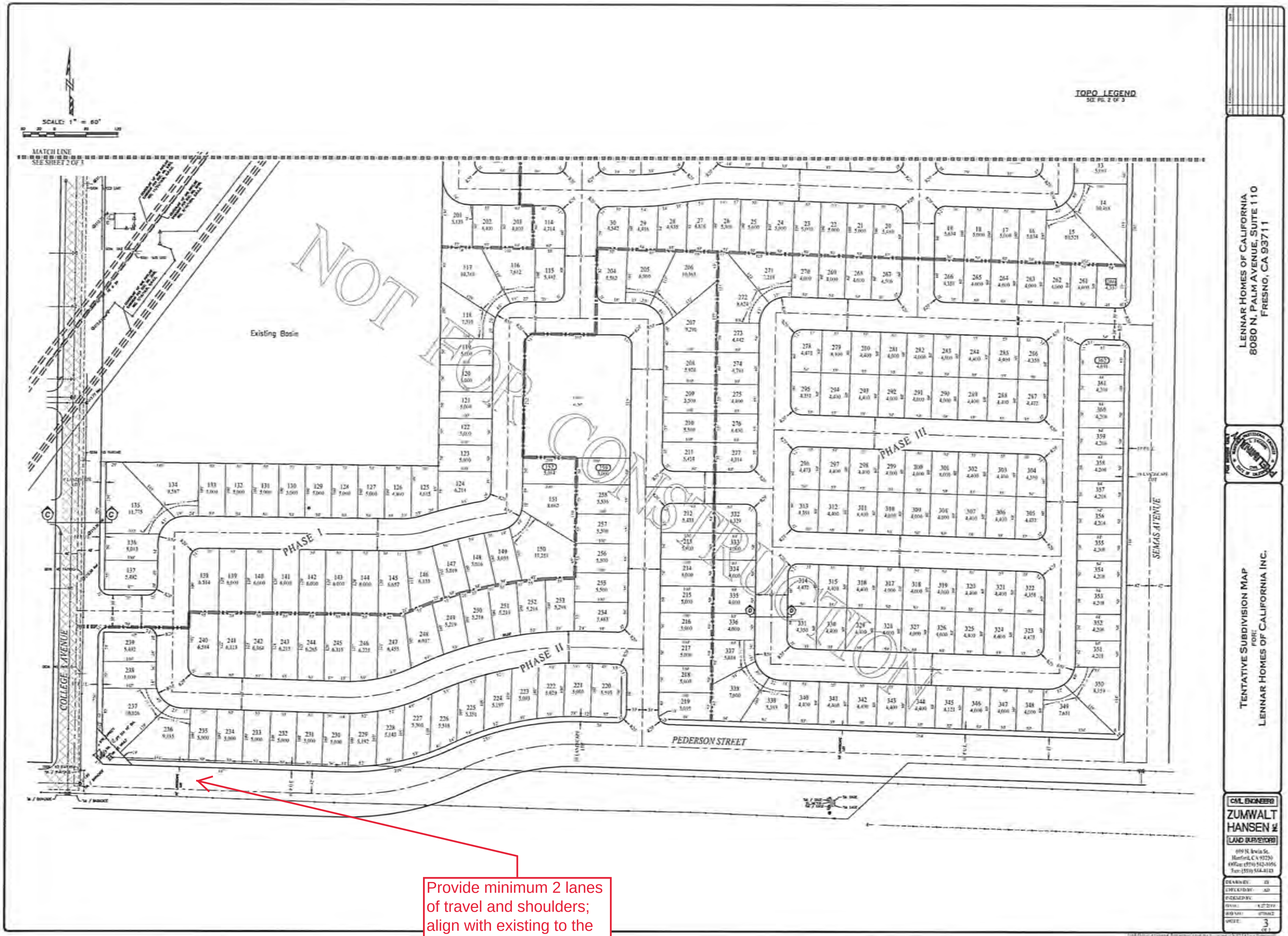
DRIVEWAY
DOWN GUY
ELECTRIC CHRISTY BOX
ELECTRIC METER
ELECTRIC PEDESTAL
ELECTRIC SERVICE
EXISTING STREET LIGHT
FIRE HYDRANT
FLAGPOLE
GAS METER
GAS SERVICE
GAS VALVE
GATE POST
GUARD POST
GUY POLE
HANDICAP PARKING
HOSEBIB
IRRIGATION AG WELL
IRRIGATION STANDPIPE
IRRIGATION VALVE
MAILBOX
MARKING PAINT
TOPO
PUMPER CONNECTION
RAILROAD XING ARM
ROOF DRAIN
RUNWAY LIGHT
SANITARY SEWER CLEANOUT
SANITARY SEWER LATERAL
SANITARY SEWER MANHOLE
SIGN
SPRINKLER CONTROL BOX
S.D. CATCH BASIN MANHOLE
STORM DRAIN INLET
STORM DRAIN MANHOLE
SERVICE POLE
TELEPHONE CHRISTY BOX
TELEPHONE MANHOLE
TELEPHONE PEDESTAL
TRAFFIC CHRISTY
TRAFFIC SIGNAL BOOM
TRAFFIC SIGNAL POLE
TRANSFORMER POLE
UTILITY POLE
WATER METER
WATER SERVICE
WATER VALVE
WATER PIV

LENNAR HOMES OF CALIFORNIA
8080 N. PALM AVENUE, SUITE 110
FRESNO, CA 93711

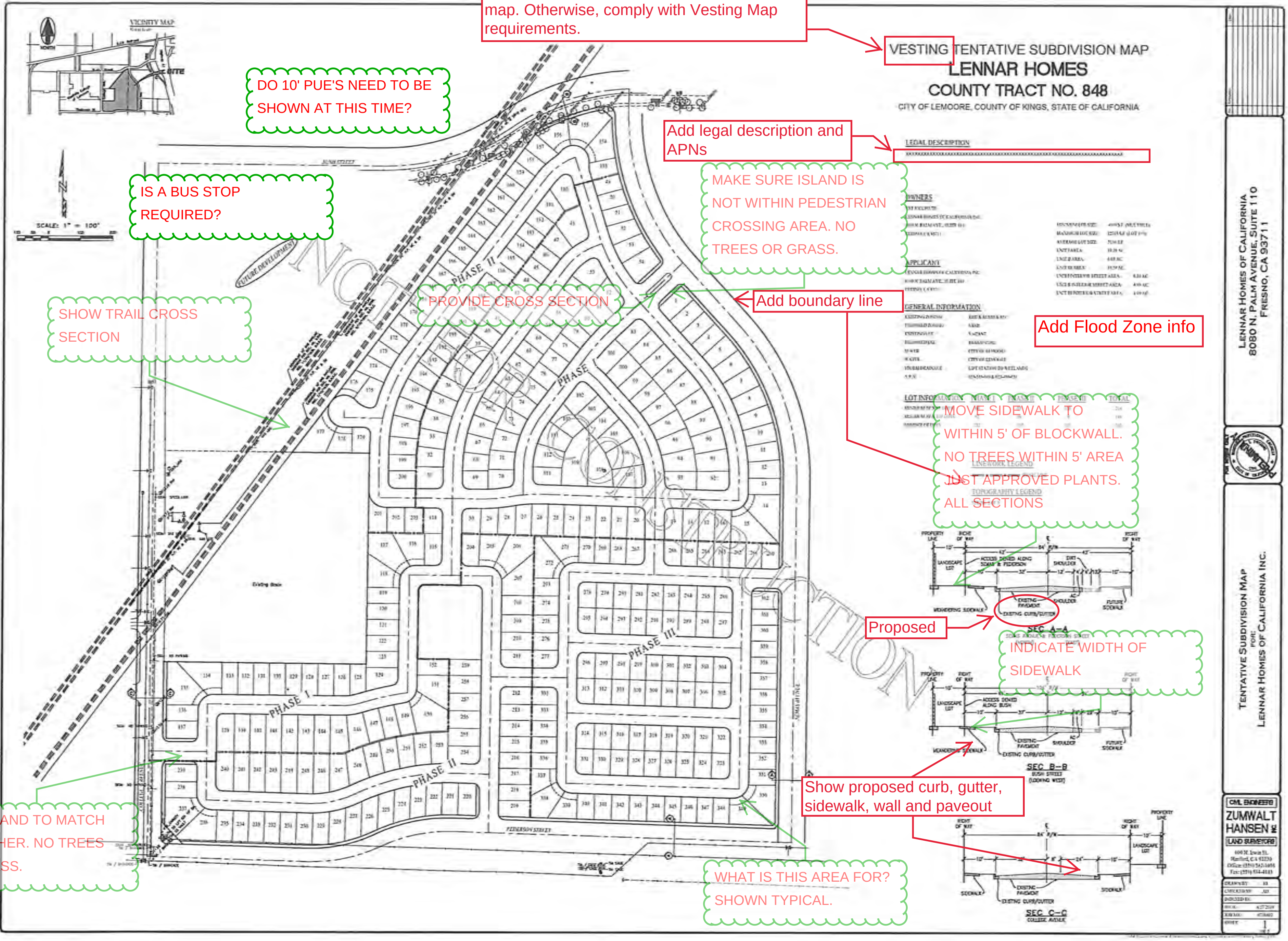
TENTATIVE SUBDIVISION MAP
FOR:
LENNAR HOMES OF CALIFORNIA INC.

CIVIL ENGINEERS
ZUMWALT
HANSEN INC.
LAND SURVEYORS
109 N. Irwin St.
Hanford, CA 93230
Office: (559) 582-1056
Fax: (559) 584-4131

DRAWN BY: JJ
CHECKED BY: AD
BOUNDARY:
DATE: 8.27.2018
JOB NO.: [illegible]
SHEET 2 OF 3



Provide minimum 2 lanes of travel and shoulders; align with existing to the west



VESTING TENTATIVE SUBDIVISION MAP

LENNAR HOMES

COUNTY TRACT NO. 848

CITY OF LEMOORE, COUNTY OF KINGS, STATE OF CALIFORNIA

LEGAL DESCRIPTION

OWNERS

APPLICANT

GENERAL INFORMATION

LOT INFORMATION PHASE I PHASE II PHASE III TOTAL

LENNAR HOMES OF CALIFORNIA
8080 N. PALM AVENUE, SUITE 110
FRESNO, CA 93711

TENTATIVE SUBDIVISION MAP
FOR:
LENNAR HOMES OF CALIFORNIA INC.

CIVIL ENGINEERS
ZUMWALT HANSEN INC.
LAND SURVEYORS

Remove "Vesting" since this not a vesting map. Otherwise, comply with Vesting Map requirements.

DO 10' PUE'S NEED TO BE SHOWN AT THIS TIME?

Add legal description and APNs

IS A BUS STOP REQUIRED?

MAKE SURE ISLAND IS NOT WITHIN PEDESTRIAN CROSSING AREA. NO TREES OR GRASS.

SHOW TRAIL CROSS SECTION

PROVIDE CROSS SECTION

Add boundary line

Add Flood Zone info

MOVE SIDEWALK TO WITHIN 5' OF BLOCKWALL. NO TREES WITHIN 5' AREA JUST APPROVED PLANTS. ALL SECTIONS

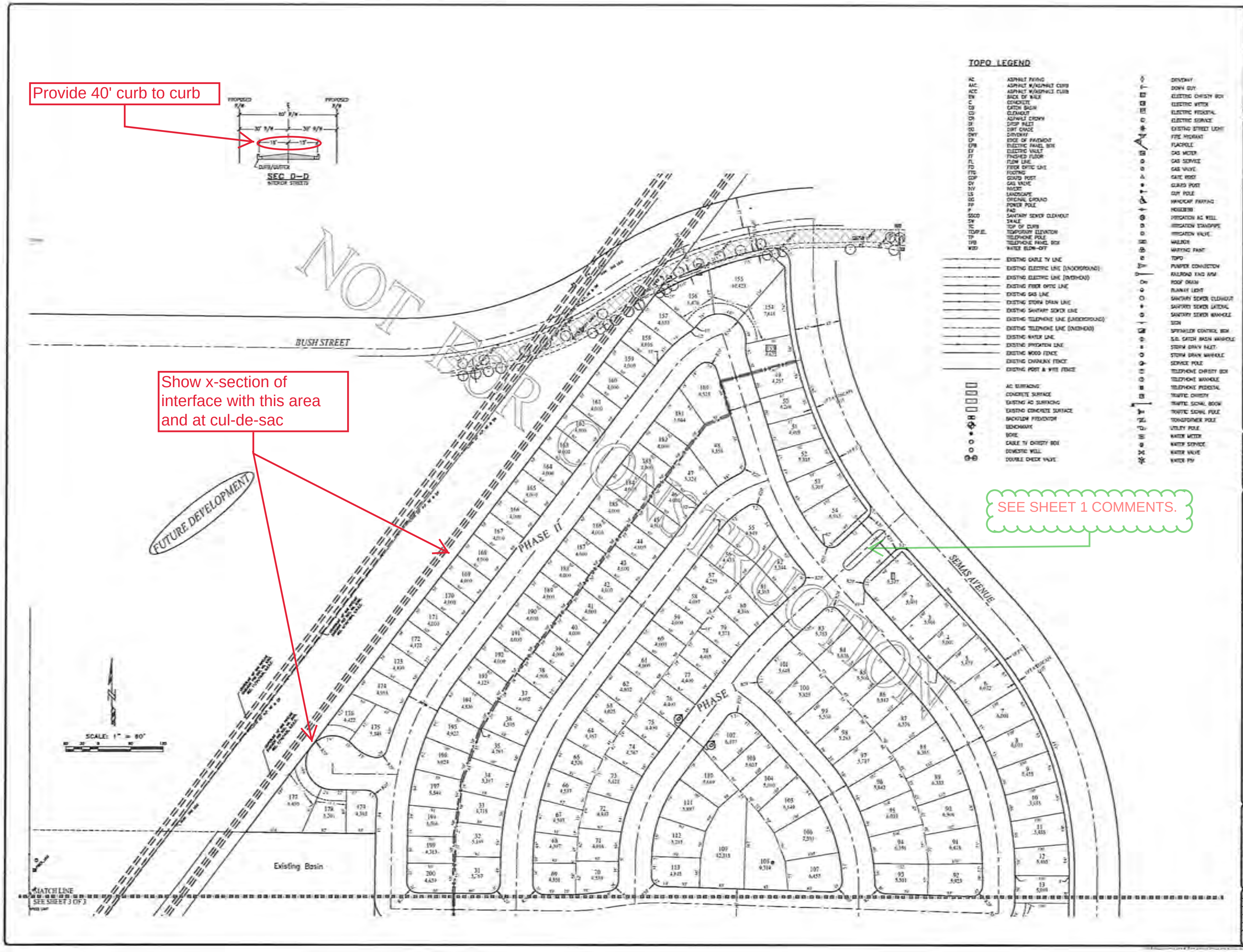
Proposed

INDICATE WIDTH OF SIDEWALK

Show proposed curb, gutter, sidewalk, wall and paveout

ADD ISLAND TO MATCH THE OTHER. NO TREES OR GRASS.

WHAT IS THIS AREA FOR? SHOWN TYPICAL.



Provide 40' curb to curb

Show x-section of interface with this area and at cul-de-sac

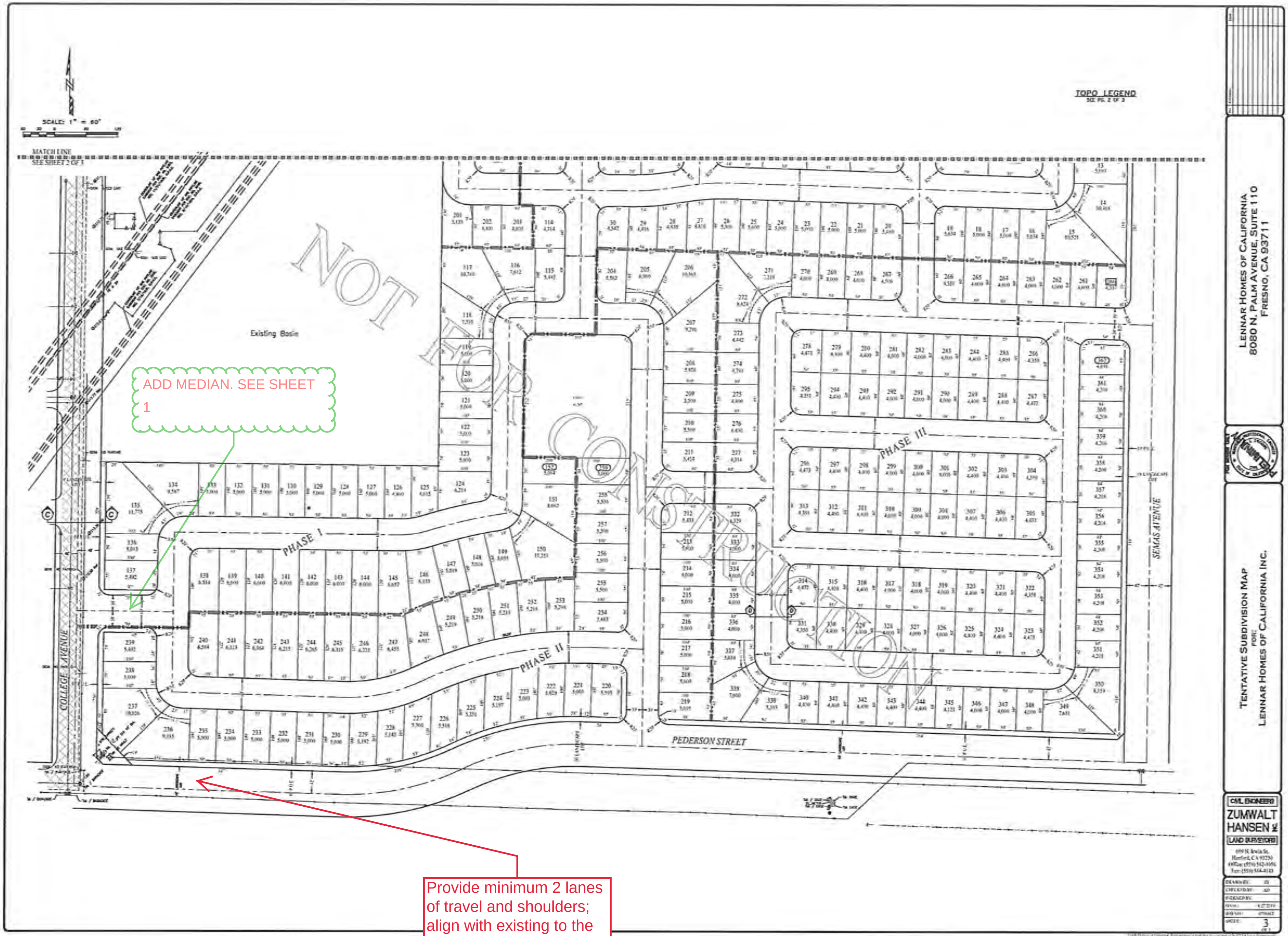
SEE SHEET 1 COMMENTS.

LENNAR HOMES OF CALIFORNIA
8080 N. PALM AVENUE, SUITE 110
FRESNO, CA 93711

TENTATIVE SUBDIVISION MAP
FOR:
LENNAR HOMES OF CALIFORNIA INC.

CIVIL ENGINEERS
ZUMWALT HANSEN INC.
LAND SURVEYORS

SHEET 2



ADD MEDIAN. SEE SHEET 1

Provide minimum 2 lanes of travel and shoulders; align with existing to the west

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

CITY OF LEMOORE

LENNAR HOMES TENTATIVE TRACT MAP 848

Comments must be received by: May 11, 2020 (30 days after notice)

APRIL 2020

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

LENNAR HOMES TENTATIVE TRACT MAP 848

Prepared for:

City of Lemoore
711 West Cinnamon Drive
Lemoore, CA 93245
Contact Person: Judy Holwell, Community Development Director
Phone: (559) 924-6744

Consultant:

901 East Main Street
Visalia, CA 93292
Contact: Steve Brandt, City Planner
Phone: (559) 733-0440

April 2020

Project #190002.02 44

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MITIGATED NEGATIVE DECLARATION

As Lead Agency under the California Environmental Quality Act (CEQA), the City of Lemoore reviewed the project described below to determine whether it could have a significant effect on the environment because of its development. In accordance with CEQA Guidelines Section 15382, "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Project Name

Lennar Homes Tract 848

Project Location

The project site is located on the southwest corner of Bush Avenue and College Avenue in the City of Lemoore, Kings County, CA. The project site is within Assessor's Parcel Numbers 023-510-040 and 023-480-031, which totals approximately 54.1 acres in area.

Project Description

The project is a residential subdivision that requires a General Plan Amendment (GPA No. 2020-02), a Zone Change (ZMA No. 2020-02), a Planned Unit Development (PUD No. 2020-01), a Tentative Tract Map (TTM 848) and Major Site Plan Review (SPR No. 2020-01).

Mailing Address and Phone Number of Contact Person

Bill Walls, Applicant
Lennar Homes
8080 N Palm Avenue, Suite 110
Fresno, CA 93711
(559) 437-4269

Findings

As Lead Agency, the City finds that the project will not have a significant effect on the environment. The Initial Study (IS) (see *Section 3 - Environmental Checklist*) identified one or more potentially significant effects on the environment, but revisions to the project have been made before the release of this Mitigated Negative Declaration (MND) or mitigation measures would be implemented that reduce all potentially significant impacts to less-than-significant levels. The City further finds that there is no substantial evidence that this project would have a significant effect on the environment.

Mitigation Measures Included in the Project to Avoid Potentially Significant Effects

MITIGATION MEASURE(S)

MM BIO-1: Prior to ground disturbing activities, a qualified wildlife biologist shall conduct a biological clearance survey between 14 and 30 calendar days prior to the onset of construction. The clearance survey shall include walking transects to identify presence of San Joaquin kit fox, loggerhead shrike, Swainson's hawk, western burrowing owl, yellow-head and tricolor blackbirds, other nesting birds_and other special-status species or signs of, and sensitive natural communities. The preconstruction survey shall be walked by no greater than 30-foot transects for 100 percent coverage of the project site and the 50-foot buffer, where feasible. A report outlining the results of the survey shall be submitted to the Lead Agency.

Potential kit fox dens may be excavated provided that the following conditions are satisfied: (1) the den has been monitored for at least five consecutive days and is deemed unoccupied by a qualified biologist; (2) the excavation is conducted by or under the direct supervision of a qualified biologist. Den monitoring and excavation should be conducted in accordance with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (United States Fish and Wildlife Service, 2011).

In addition, impacts to occupied burrowing owl burrows shall be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: (1) the birds have not begun egg laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

MM BIO-2: Prior to ground disturbance activities, or within one week of being deployed at the project site for newly hired workers, all construction workers at the project site shall attend a Construction Worker Environmental Awareness Training and Education Program, developed and presented by a qualified biologist.

The Construction Worker Environmental Awareness Training and Education Program shall be presented by the biologist and shall include information on the life history of wildlife and plant species that may be encountered during construction activities, their legal protections, the definition of "take" under the Endangered Species Act, measures the project operator is implementing to protect the species, reporting requirements, specific measures that each worker must employ to avoid take of the species, and penalties for violation of the act. Identification and information regarding special-status or other sensitive species with the potential to occur on the project site shall also be provided to construction personnel. The program shall include:

- An acknowledgement form signed by each worker indicating that environmental training has been completed; and
- A copy of the training transcript and/or training video/CD, as well as a list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be maintained on site for the duration of construction activities.

MM BIO-3: The following measures shall be implemented to reduce potential impacts to Swainson's hawk: Nesting surveys for the Swainson's hawks shall be conducted in accordance with the protocol outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). If potential Swainson's hawk nests or nesting substrates are located within a half mile of the project site, then those nests or substrates must be monitored for activity on a routine and repeating basis throughout the breeding season, or until Swainson's hawks or other raptor species are verified to be using them. The protocol recommends that the following visits be made to each nest or nesting site: one visit during January 1–March 20 to identify potential nest sites, three visits during March 20–April 5, three visits during April 5–April 20, and three visits during June 10–July 30. A fewer number of visits may be permissible if deemed adequate by the City after consultation with a qualified biologist. To meet the minimum level of protection for the species, surveys shall be completed for at least the two survey periods immediately prior to project-related ground disturbance activities. If Swainson's hawks are not found to nest within the survey area, then no further action is warranted.

If Swainson's hawks are found to nest within the survey area, active Swainson's hawk nests shall be avoided by a half mile during the nesting period, unless this avoidance buffer is reduced through consultation with the CDFW and/or a qualified biologist with expertise in Swainson's hawk issues. If a construction area falls within this nesting site, construction must be delayed until the young have fledged (left the nest). The 2,500-foot radius no-construction zone may be reduced in size, but in no case shall be reduced to less than 500 feet except where a qualified biologist concludes that a smaller buffer area is sufficiently protective. A qualified biologist must conduct construction monitoring on a daily basis, inspect the nest on a daily basis, and ensure that construction activities do not disrupt breeding behaviors.

MM BIO-4: A qualified biologist shall conduct a preconstruction survey on the project site and within 500 feet of its perimeter, where feasible, to identify the presence of the western burrowing owl. The survey shall be conducted between 14 and 30 days prior to the start of construction activities. If any burrowing owl burrows are observed during the preconstruction survey, avoidance measures shall be consistent with those included in the CDFW staff report on burrowing owl mitigation (CDFG 2012). If occupied burrowing owl burrows are observed outside of the breeding season (September 1 through January 31) and within 250 feet of proposed construction activities, a passive relocation effort may be instituted in accordance with the guidelines established by the California Burrowing Owl Consortium (1993) and the California Department of Fish and Wildlife (2012). During the breeding season (February 1 through August 31), a 500-foot (minimum) buffer zone should be maintained unless a qualified biologist verifies through noninvasive methods that either the birds have not begun egg laying and incubation or that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

MM BIO-5: If construction is planned outside the nesting period for raptors (other than the western burrowing owl) and migratory birds (February 15 to August 31), no mitigation shall be required. If construction is planned during the nesting season for migratory birds and raptors, a preconstruction survey to identify active bird nests shall be conducted by a qualified biologist to evaluate the site and a 250-foot buffer for migratory birds and a 500-foot buffer for raptors. If nesting birds are identified during the survey, active raptor nests shall be avoided by 500 feet and all other migratory bird nests shall be avoided by 250 feet. Avoidance buffers may be reduced if a qualified onsite monitor determines that encroachment into the buffer area is not affecting nest building, the rearing of young, or otherwise affecting the breeding behaviors of the resident birds. Because nesting birds can establish new nests or produce a second or even third clutch at any time during the nesting season, nesting bird surveys shall be repeated every 30 days as construction activities are occurring throughout the nesting season.

No construction or earth-moving activity shall occur within a non-disturbance buffer until it is determined by a qualified biologist that the young have fledged (left the nest) and have attained sufficient flight skills to avoid project construction areas. Once the migratory birds or raptors have completed nesting and young have fledged, disturbance buffers will no longer be needed and can be removed, and monitoring can cease.

MM BIO-6: During all construction-related activities, the following mitigation shall apply:

a. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers. 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 the construction or project site.
b. Construction-related vehicle traffic shall be restricted to established roads and predetermined ingress and egress corridors, staging, and parking areas. Vehicle speeds should not exceed 20 miles per hour (mph) within the project site.
c. To prevent inadvertent entrapment of kit fox or other animals during construction, the contractor shall cover all excavated, steep-walled holes or trenches more than two feet deep at the close of each workday with plywood or similar materials. If holes or trenches cannot be covered, one or more escape ramps constructed of earthen fill or wooden planks shall be installed in the trench. Before such holes or trenches are filled, the contractor shall thoroughly inspect them for entrapped animals. All construction-related pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored on the project site shall be thoroughly inspected for wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in anyway. If at any

time an entrapped or injured kit fox is discovered, work in the immediate area shall be temporarily halted and USFWS and CDFW shall be consulted.

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 four-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 has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
e. No pets, such as dogs or cats, shall be permitted on the project sites to prevent harassment, mortality of kit foxes, or destruction of dens.
f. Use of anti-coagulant rodenticides and herbicides in project areas 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, as well as additional project-related restrictions deemed necessary by the USFWS and CDFW. If rodent control must be conducted, zinc phosphide shall be used because of the proven lower risk to kit foxes.
g. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative shall be identified during the employee education program and their name and telephone number shall be provided to the USFWS.
h. The Sacramento Fish and Wildlife Office of USFWS and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact can be reached at (559) 243-4014 and R4CESA@wildlifeca.gov.
i. All sightings of the San Joaquin kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed shall also be provided to the Service at the address below.
j. Any project-related information required by the USFWS or questions concerning the above conditions, or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at: Endangered Species Division, 2800 Cottage Way, Suite W 2605, Sacramento, California 95825-1846, phone (916) 414-6620 or (916) 414-6600.
k. If burrowing owls are found to occupy the project site and avoidance is not possible, burrow exclusion may be conducted by qualified biologists only during the non-breeding season, before breeding behavior is exhibited, and after the burrow is confirmed empty through non-invasive methods (surveillance). Replacement or

occupied burrows shall consist of artificial burrows at a ratio of one burrow collapsed to one artificial burrow constructed (1:1). Ongoing surveillance of the project site during construction activities shall occur at a rate sufficient to detect burrowing owl, if they return.

MM CUL-1: Prior to any ground disturbance, a surface inspection of the site shall be conducted by a Tribal Monitor. The Tribal Cultural staff shall monitor the site during initial grading activities. The Tribal Cultural Staff shall provide preconstruction briefings to supervisory personnel and any excavation contractor, which will include information on potential cultural material finds and, on the procedures, to be enacted if resources are found. Prior to any ground disturbance, the applicant shall offer the Santa Rosa Rancheria Tachi Yokut Tribe the opportunity to provide a Native American Monitor during ground disturbing activities during both construction and decommissioning. Tribal participation would be dependent upon the availability and interest of the tribe.

MM CUL-2: In the event that cultural resources are discovered during construction or decommissioning. Operations shall stop within 100 feet of the find, and a qualified archeologist shall determine whether the resource requires further study. The qualified archaeologist shall determine the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with §15064.5 of the CEQA Guidelines. Mitigation measures may include avoidance, preservation in-place, recordation, additional archaeological testing, and data recovery, among other options. Any previously undiscovered resources found during construction within the project area shall be recorded on appropriate Department of Parks and Recreation forms and evaluated for significance. No further ground disturbance shall occur in the immediate vicinity of the discovery until approved by the qualified archaeologist.

The City along with other relevant or Tribal officials, shall be contacted upon the discovery of cultural resources to begin coordination on the disposition of the find(s). Treatment of any significant cultural resources shall be undertaken with the approval of the Lead/Permitting Agency.

MM CUL-3: Upon coordination with the City any archaeological artifacts recovered shall be donated to an appropriate Tribal custodian or a qualified scientific institution where they would be afforded applicable cultural resources laws and guidelines.

MM CUL-4: If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code. The specific protocol, guidelines, and channels of communication outlined by the Native American Heritage Commission, in accordance with Section 7050.5 of the Health and Safety Code, Section 5097.98 of the Public Resources Code (Chapter 1492, Statutes of 1982, Senate Bill 297), and Senate Bill 447 (Chapter 44, Statutes of 1987), shall be followed. Section 7050.5(c) shall guide the potential Native American involvement, in the event of discovery of human remains, at the direction of the county coroner.

MM GEO-1: Prior to issuing of grading or building permits, the project applicant shall submit to the City: (1) the approved Storm Water Pollution Prevention Plan (SWPPP) and (2) the Notice of Intent (NOI) to comply with the General National Pollutant Discharge Elimination System (NPDES) from the Central Valley Regional Water Quality Control Board. The requirements of the SWPPP and NPDES shall be incorporated into design specifications and construction contracts. Recommended Best Management Practices for the construction phase may include the following:

- Stockpiling and disposing of demolition debris, concrete, and soil properly;
- Protecting existing storm drain inlets and stabilizing disturbed areas;
- Implementing erosion controls;
- Properly managing construction materials; and
- Managing waste, aggressively controlling litter, and implementing sediment controls.

Evidence of the approved SWPPP shall be submitted to the Lead Agency.

MM GEO-2: If any paleontological resources are encountered during ground disturbance activities, all work within 25 feet of the find shall halt until a qualified paleontologist as defined by the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (2010), can evaluate the find and make recommendations regarding treatment. Paleontological resource materials may include resources such as fossils, plant impressions, or animal tracks preserved in rock. The qualified paleontologist shall contact the Natural History Museum of Los Angeles County or other appropriate facility regarding any discoveries of paleontological resources.

If the qualified paleontologist determines that the discovery represents a potentially significant paleontological resource, additional investigations and fossil recovery may be required to mitigate adverse impacts from project implementation. If avoidance is not feasible, the paleontological resources shall be evaluated for their significance. If the resources are not significant, avoidance is not necessary. If the resources are significant, they shall be avoided to ensure no adverse effects, or such effects must be mitigated. Construction in that area shall not resume until the resource appropriate measures are recommended or the materials are determined to be less than significant. If the resource is significant and fossil recovery is the identified form of treatment, then the fossil shall be deposited in an accredited and permanent scientific institution. Copies of all correspondence and reports shall be submitted to the Lead Agency.

MM TRA-1: Prior to completion of Phase 1, the project developer shall complete the following:

a. **Bush Street at SR 41 NB Ramps:**

   - Signalize or install a temporary roundabout.
   - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections.

b. Bush Street at Belle Haven Drive:

- Signalize the intersection or install a temporary roundabout.
- Coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection. Lengthen the southbound left-turn pocket from 75 feet to 100 feet.
- Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane.
- Construct an eastbound 75 feet left-turn pocket.
- Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two through lanes and a separate right-turn lane.
- Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket.

c. Bush Street at SR 41 SB Ramps:

- Signalize the intersection or install a temporary roundabout.
- Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections.
- Lengthen the westbound left-turn pocket from 249 feet to 350 feet.

d. Bush Street at 19 ½ Avenue:

- Lengthen the northbound left-turn pocket from 48 feet to 175 feet.

SECTION 1 - INTRODUCTION

1.1 - Overview

Requests by Lennar Homes (Applicant) and Patrick Ricchiuti (Owner), for a residential subdivision which requires a General Plan Amendment (GPA No. 2020-02), Major Site Plan Review (SPR No. 2020-01), Planned Unit Development (PUD No. 2020-01), Zone Change (ZMA No. 2020-02), and Tentative Tract Map (TTM 848). The project site plan includes 362 dwelling units in three phases.

1.2 - CEQA Requirements

The City of Lemoore is the Lead Agency for this project pursuant to the CEQA Guidelines (Public Resources Code Section 15000 et seq.). The Environmental Checklist (CEQA Guidelines Appendix G) or Initial Study (IS) (see *Section 3 – Initial Study*) provides analysis that examines the potential environmental effects of the construction and operation of the project. Section 15063 of the CEQA Guidelines requires the Lead Agency to prepare an IS to determine whether a discretionary project will have a significant effect on the environment. A Mitigated Negative Declaration (MND) is appropriate when an IS has been prepared and a determination can be made that no significant environmental effects will occur because revisions to the project have been made or mitigation measures will be implemented that reduce all potentially significant impacts to less-than-significant levels.

Based on the IS, the Lead Agency has determined that the environmental review for the proposed application can be completed with an MND.

1.3 - Impact Terminology

The following terminology is used to describe the level of significance of project environmental impacts.

- A finding of "no impact" is appropriate if the analysis concludes that the project would not affect a topic area in any way.
- An impact is considered "less than significant" if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.
- An impact is considered "less than significant with mitigation incorporated" if the analysis concludes that it would cause no substantial adverse change to the environment with the inclusion of environmental commitments that have been agreed to by the proponent.
- An impact is considered "potentially significant" if the analysis concludes that it could have a substantial adverse effect on the environment.

1.4 - Document Organization and Contents

The content and format of this IS/MND is designed to meet the requirements of CEQA. The report contains the following sections:

- *Section 1 – Introduction:* This section provides an overview of CEQA requirements, intended uses of the IS/MND, document organization, and a list of regulations that have been incorporated by reference.
- *Section 2– Project Description:* This section describes the project and provides data on the site's location.
- *Section 3 – Environmental Checklist:* This section contains the evaluation of 18 different environmental resource factors contained in Appendix G of the CEQA Guidelines. Each environmental resource factor is analyzed to determine whether the proposed project would have an impact. One of four findings is made which include: no impact, less-than-significant impact, less than significant with mitigation, or significant and unavoidable. If the evaluation results in a finding of significant and unavoidable for any of the 18 environmental resource factors, then an Environmental Impact Report will be required.
- *Section 4 – References:* This section contains a full list of references that were used in the preparation of this IS/MND.

1.5 - Incorporated by Reference

The following documents and/or regulations are incorporated into this IS/MND by reference:

- City of Lemoore General Plan
- City of Lemoore Zoning Ordinance
- City of Lemoore Municipal Code
- City of Lemoore 2015 Urban Water Management Plan
- City of Lemoore Master Storm Drain Plan
- 2015 Kings County Emergency Operations Plan
- California Title 24 Code of Regulations (2019)

SECTION 2 - PROJECT DESCRIPTION

2.1 - Introduction

Requests by Lennar Homes for a residential subdivision that requires a General Plan Amendment (GPA No. 2020-02), Major Site Plan Review (SPR No. 2020-01), Planned Unit Development (PUD No. 2020-01), Zone Change (ZMA No. 2020-02), and Tentative Tract Map (TTM 848). The project site plan includes Neighborhood Commercial, Public Recreation, Low, Low-Medium, and Medium land uses, and a total of 362 single-family homes on approximately 54.1 acres.

2.2 - Project Location

The proposed site is in Sections 8 and 9, Township 19 South, Range 20 East, Mount Diablo Base and Meridian, within the incorporated City of Lemoore, County of Kings, California. The project site is located on the southeast corner of Bush Avenue and College Avenue within Assessor's Parcel Numbers (APNs) 023-510-040 and 023-480-031, which totals approximately 54.1 acres in area. The regional location is depicted on Figure 2-1 and the project site location is depicted on Figure 2-2.

2.3 - Surrounding Land Uses

The area surrounding the project site consists of undeveloped land to the north, east, and south, and West Hills College to the west. Planned land uses and development surrounding the site are depicted on Figure 2-3.

2.4 - Proposed Project

The project is a residential subdivision that requires a General Plan Amendment (GPA No. 2020-02), Major Site Plan Review (SPR No. 2020-01), Planned Unit Development (PUD No. 2020-01), and Zone Change (ZMA No. 2020-02), and Tentative Tract Map (TTM 848), within Assessor's Parcel Numbers (APNs) 023-510-040 and 023-480-031, which totals approximately 54.1 acres in area, and includes these uses:

- 362 single-family dwelling units on 54.1 acres located on the northeast corner of the new alignment of Semas Avenue and Pedersen Street south of the high-pressure gas pipeline easement. The single-family dwelling units will be constructed in three phases. Phase 1 will consist of 152 dwelling units, Phases 1 and 2 will consist of 259 dwelling units, Phases 1, 2, and 3 will consist of 362 dwelling units.
- Upzoning of 23.4 acres of vacant land to maintain the same number of dwelling units planned in the General Plan Housing Element. The land to be upzoned would not be developed with this project. The upzoning would be zoned for a future development consisting of approximately 200 multi-family dwelling units and approximately 20,000 square-feet of retail shopping space not to be constructed with this project, located on the southeast corner of College Avenue and Bush Street, north of the trail and gas pipeline easement. The upzoning is required to meet the requirements of

Government Code Section 66300(b)(1) and maintains the total number of planned residential units at the pre-project amount. Additional environmental review would be required.

As part of this project, the following roadways will be constructed:

- Semas Drive – new alignment, located to the east of the project; also known as Semas Avenue.
- Pedersen Street – located to the south of the project; also known as Pedersen Avenue or Pedersen Avenue or Pedersen Street.
- College Avenue – extension from current terminus to Pedersen Street; also known as College Drive.

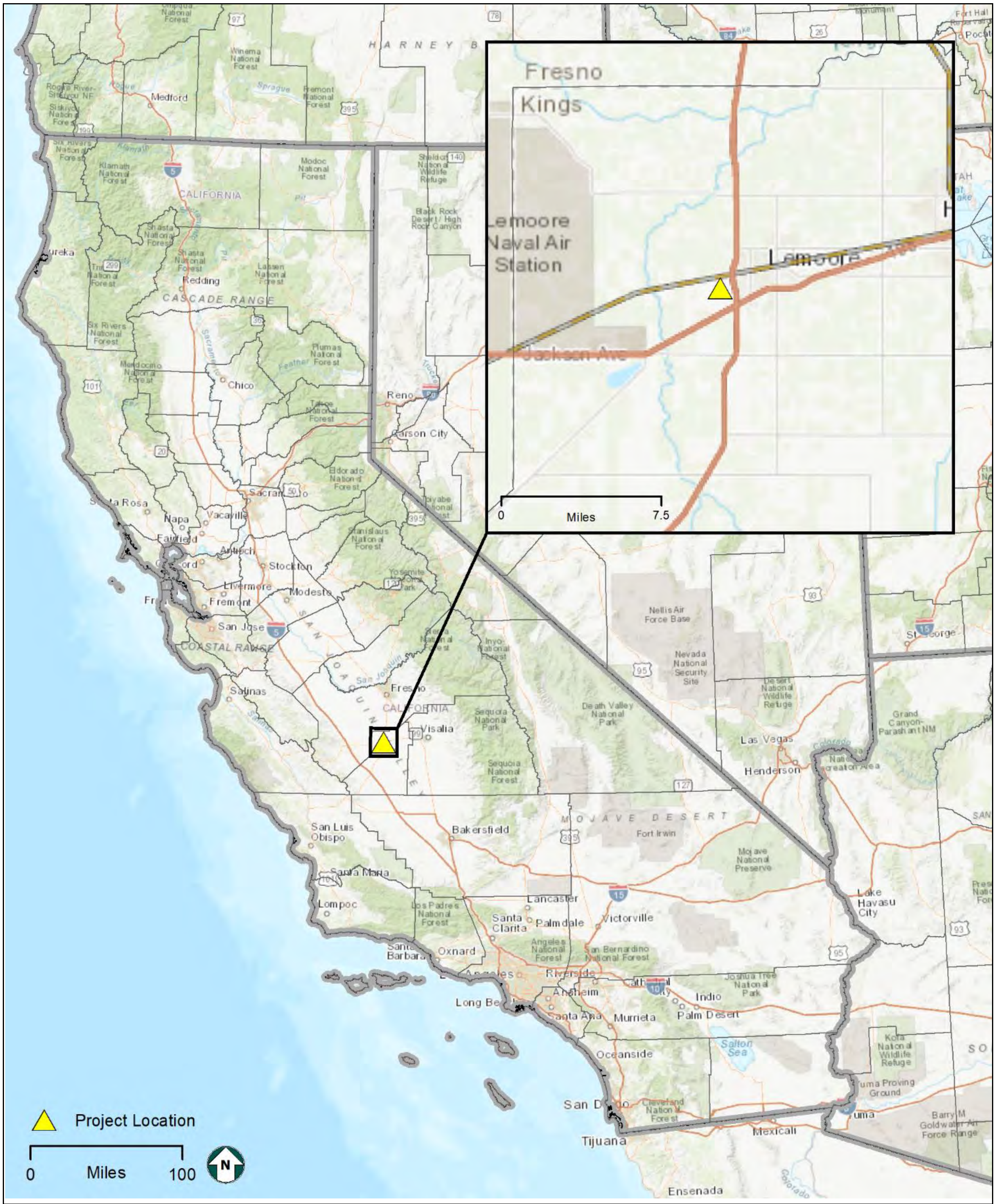

Figure 2-1
Regional Location

Figure 2-2
Project Site

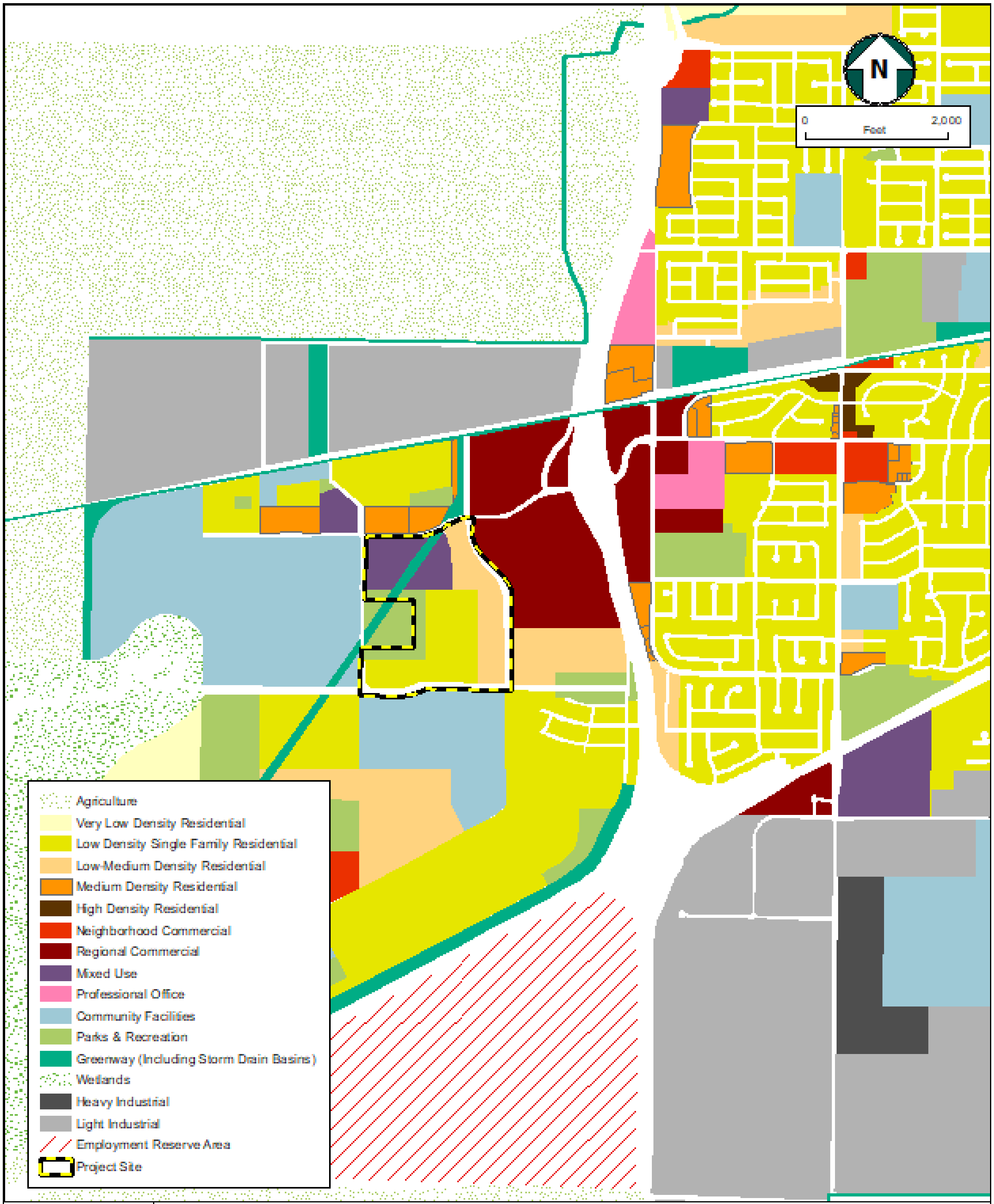

Figure 2-3
Surrounding Planned Land Uses

SECTION 3 - EVALUATION OF ENVIRONMENTAL IMPACTS

3.1 - Environmental Checklist and Discussion

1. **Project Title:**

   Lennar Homes Tentative Tract Map 848

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

   City of Lemoore
   711 W. Cinnamon Drive
   Lemoore, CA 93245

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

   Judy Holwell, Community Development Director
   (559) 924-6744

4. **Project Location:**

   The project site is located on the southeast corner of Bush Avenue and College Avenue in the City of Lemoore, Kings County, CA. The project site includes Assessor's Parcel Numbers (APNs) 023-510-040 and 023-480-031, which totals approximately 54.1 acres in area.

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

   Bill Walls
   Lennar Homes
   8080 N Palm Avenue, Suite 110
   Fresno, CA 93711
   (559) 437-4269

6. **General Plan Designation:**

   Low Density Residential (RLD), Low Medium Density Residential (RLMD), and Mixed Use (MU)

7. **Zoning:**

   RLD, RLMD, and MU

8. **Description of Project:**

   See *Section 2.4 – Proposed Project*.

9. Surrounding Land Uses and Setting:

See *Section 2.3 – Surrounding Land Uses* and Figure 2-3.

10. Other Public Agencies Whose Approval May be Required:

- San Joaquin Valley Air Pollution Control District (SJVAPCD)
- Regional Water Quality Control Board - Lahontan (RWQCB)
- State Water Resource Control Board (SWRCB)

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code Section 21080.3.1? If so, has consultation begun?

On September 27, 2019, it was 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 (Applied EarthWorks, Inc , 2019). The NAHC responded on October 2, 2019, with its findings and attached a list of Native American tribes and individuals culturally affiliated with the project area. On October 17, 2019, an outreach letter was mailed to each of the contacts identified by the NAHC (Appendix C). The outreach letter and follow-up calls are considered best practices within cultural resource management. (Applied EarthWorks, Inc , 2019)

NOTE: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code Section 21083.3.2.) Information may also be available from the California Native American Heritage Commission’s Sacred Lands File per Public Resources Code Section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code Section 21082.3(c) contains provisions specific to confidentiality.

3.2 - 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 on the following pages.

☐ Aesthetics
☐ Agriculture and Forest Resources
☐ Air Quality
☐ Biological Resources
☐ Cultural Resources
☐ Geology/Soils
☐ Greenhouse Gas Emissions
☐ Hazards & Hazardous Materials
☐ Hydrology/Water Quality
☐ Land Use/Planning
☐ Mineral Resources
☐ Noise
☐ Population/Housing
☐ Public Services
☐ Recreation
☐ Transportation/Traffic
☐ Utilities/Service Systems
☐ Findings of Significance

3.3 - 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 (a) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (b) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENT 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 EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

< Judy Holwell >
Judy Holwell, Community Development Director

April 9, 2020
Date

3.4 - Evaluation of Environmental Impacts

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2. All answers must take account of the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: “Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-Than-Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a. Earlier Analysis Used. Identify and state where they are available for review;
   b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis; and
   c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated,” describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a

previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7. Supporting Information Sources: A source list should be attached, and other sources used, or individuals contacted should be cited in the discussion.

8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9. The explanation of each issue should identify:

   a. The significance criteria or threshold, if any, used to evaluate each question; and
   b. The mitigation measure identified, if any, to reduce the impact to less than significant.

3.4.1 - AESTHETICS

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:					
a.	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b.	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c.	In non-urbanized area, substantially degrade the existing visual character or quality of public views of the site and its surroundings? If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d.	Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Discussion

Impact #3.4.1a – Would the project have a substantial adverse effect on a scenic vista?

As seen in Figure 2-1, the project site consists of undeveloped land and is surrounded by undeveloped land to the north, east, and south, and schools to the west. The project site is located on the southeast corner of Bush Avenue and College Avenue in the City of Lemoore, Kings County, CA.

The City of Lemoore 2030 General Plan Community Design Element includes an implementing action specific to scenic vistas:

- CD-I-4: Maintain scenic vistas to the Coalinga Mountains, other natural features, and landmark buildings.

The City of Lemoore 2030 General Plan states that there are no buildings or structures listed in the National Register of Historic Places or as California Historic Landmarks. However, there are 37 sites listed as having local historic significance located within the downtown district (City of Lemoore , 2008). There are no natural features or landmark buildings within the vicinity of the project site. The project is not located in an area that would result in substantial adverse effects on any scenic vistas, therefore, causing no negative impacts.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.1b – Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

There are no listed State scenic highways within or near the City of Lemoore, nor are there scenic highways in Kings County; therefore, the site would not damage scenic resources within a State scenic highway (California Department of Transportation, 2020). The closest eligible scenic highway is SR 41, southwest of SR 33, which is approximately 35 miles southwest of the project site.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.1c – In non-urbanized area, substantially degrade the existing visual character or quality of public views of the site and its surroundings? If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

The overall visual character of the site itself would change, as the currently undeveloped land would be improved with residential uses. However, the proposed project would be similar in visual appearance to the existing residential developments found throughout the City.

With the approval of the proposed General Plan Amendment and Zone Change, the project would be consistent with the zoning and land use designations. Therefore, the visual character of the site would change, as the existing vacant land is improved with residential uses. The project has been designed to be consistent with local development standards and would include landscaping and other infrastructure that would reduce the visual impact of the subdivision. The project includes onsite and offsite improvements that will be approved in compliance with the City's General Plan and Municipal Code. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.1d – Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Construction of the proposed project would be temporary and generally occur during daytime hours, typically from 7:00 a.m. to 6:00 p.m. All lighting would be directed downward and shielded to focus illumination on the desired work areas only and prevent light spillage onto adjacent properties. Because lighting used to illuminate work areas would be shielded, focused downward, and turned off by 6:00 p.m., the potential for lighting to affect any residents adversely is minimal. Increased truck traffic and the transport of construction materials to the project site would temporarily increase glare conditions during construction. However, this increase in glare would be minimal. Construction activity would focus on specific areas on the sites, and any sources of glare would not be stationary for a prolonged period of time. Therefore, construction of the proposed project would not create a new source of substantial glare that would affect daytime views in the area.

The proposed development would also comply with all lighting standards established in the City's 2030 General Plan Community Design Element, and Zoning Ordinance (Title 9, Chapter 5, Article B, Section 4), therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

3.4.2 - AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 nonagricultural use?	☐	☐	☐	☒
b.	Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
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))?	☐	☐	☐	☒
d.	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e.	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion

Impact #3.4.2a – 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 nonagricultural use?

The proposed project will not convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. According to the Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), the project site is classified as "Non-irrigated Farmland" and "Urban and Built-Up Land" (Figure 3.4.2-1), which are defined as:

- Urban and Built-Up Land - Land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
- Grazing Land - Include grazing areas, land used for dryland crop farming, and formerly irrigated land that has been left idle for three or more update cycles. (CA Department of Conservation, 2016).

The site also is not currently used for farming and is not zoned for agricultural use. Considering these factors, the proposed project will have no impact on conversion of agricultural resources.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact.***

Impact #3.4.2b – Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?

See Impact #3.4.2a response.

According to the City of Lemoore's Zoning Ordinance, the project site is currently zoned RLD (Low Density Residential), RLMD (Low Medium Density Residential), and MU (Mixed Use). The project site is not subject to a Williamson Act contract and would not conflict with any current Williamson Act contracted land in the vicinity (see Figure 3.4.2-2). Therefore, the project will not conflict with existing zoning for agricultural use or a Williamson Act contract.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact.***

Impact #3.4.2c – 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))?

According to the City of Lemoore Zoning Map, the project site and the surrounding areas are not zoned for forest land or timberland. The site will be used for a mix of residential and commercial development. The project will have no impact on land designated for forest land or timberland use.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.2d – Would the project result in the loss of forest land or conversion of forest land to non-forest use?

See discussion of Impact #3.4.2c, above.

The proposed project will have no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.2e – Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use or conversion of forest land to non-forest use?

See discussion of Impact #3.4.2c, above.

The proposed project will have no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

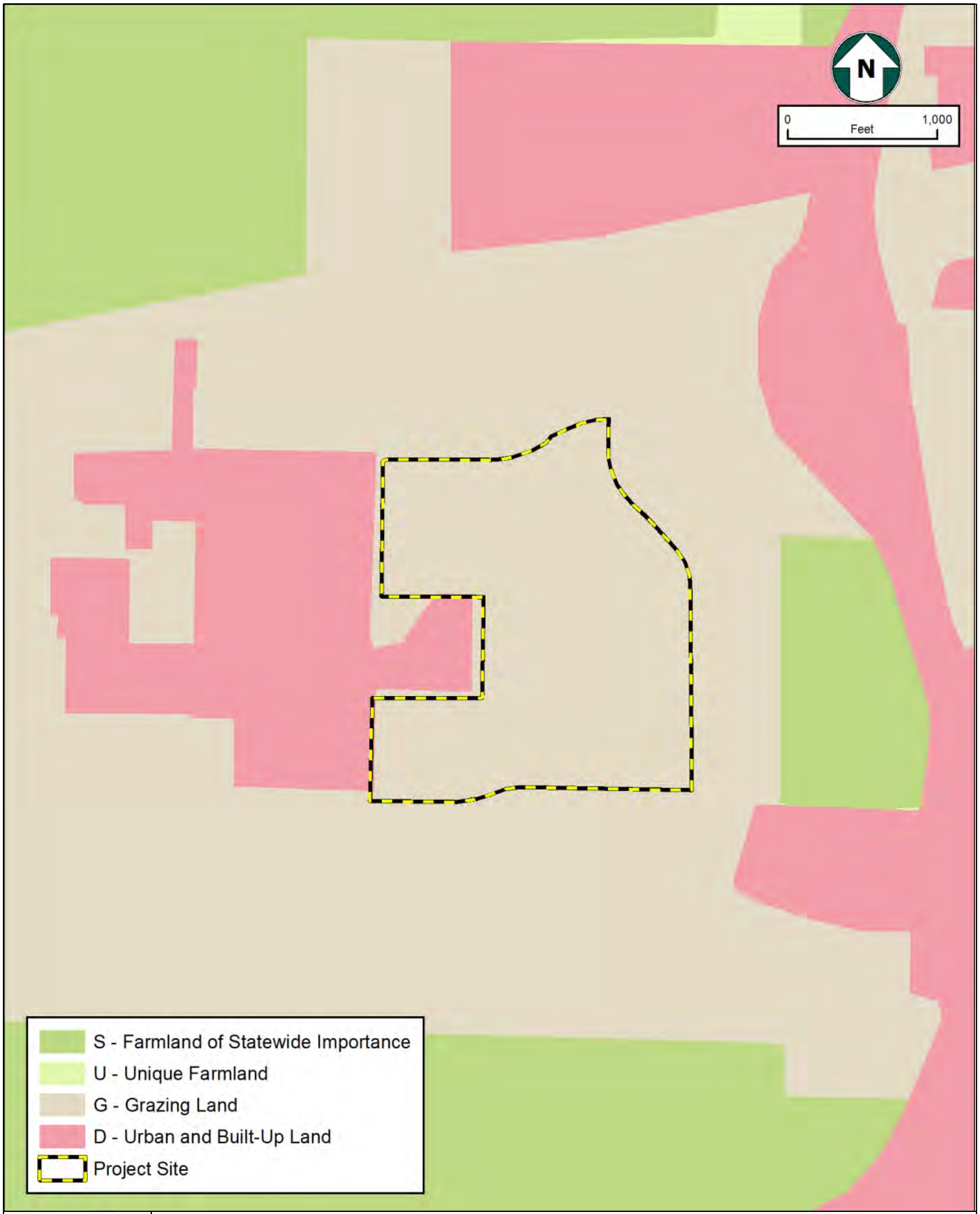

Figure 3.4.2-1
Farmland Mapping and Monitoring Program (FMMP)

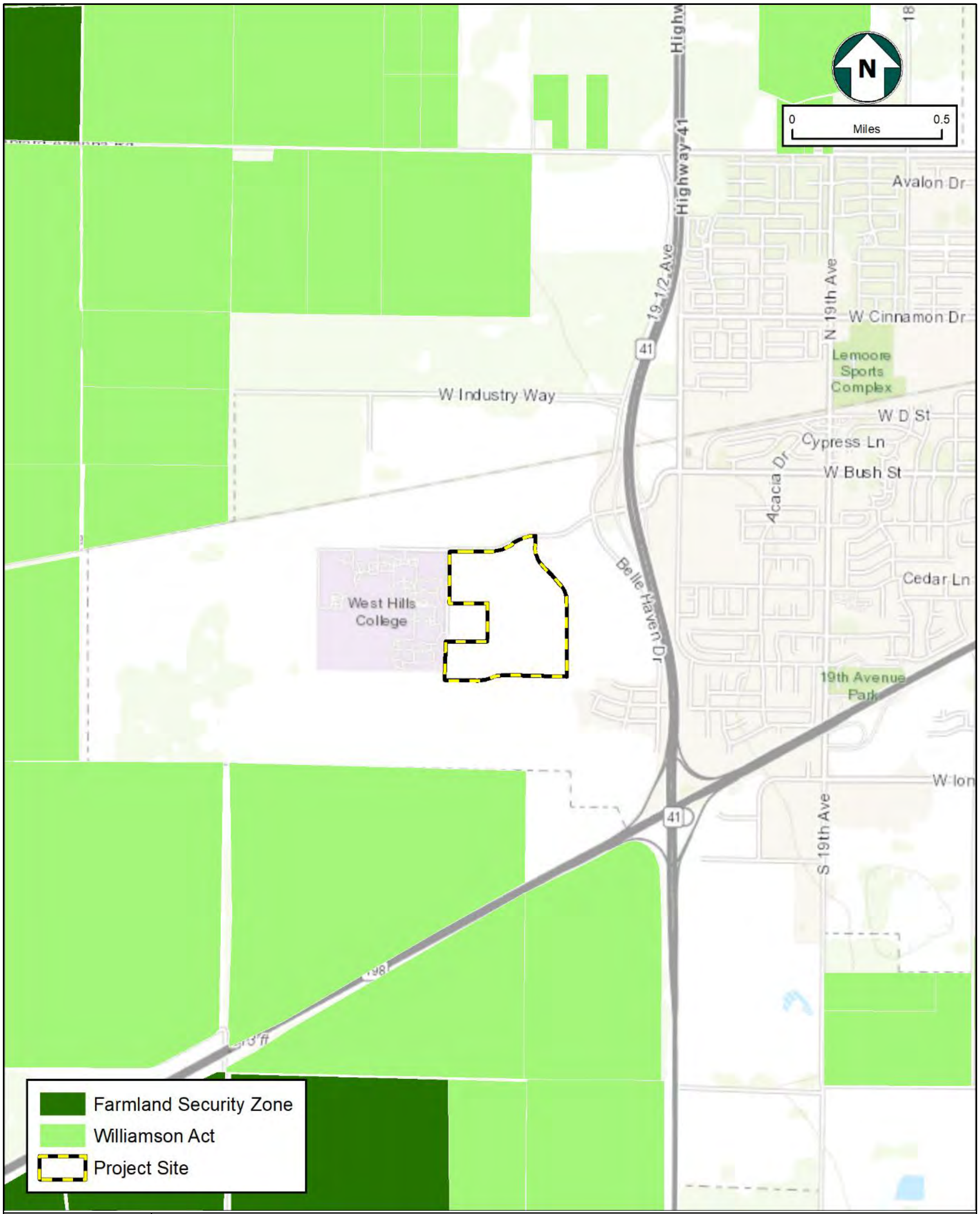

Figure 3.4.2-2
Williamson Act Contracts

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact

3.4.3 - AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a.	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b.	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard?	☐	☐	☒	☐
c.	Expose sensitive receptors to substantial pollutant concentration?	☐	☐	☒	☐
d.	Result in other emissions (such as those leading to odor) adversely affecting a substantial number of people?	☐	☒	☐	☐

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Discussion

The analysis below is based on an Air Impact Assessment (AIA) prepared by the San Joaquin Valley Air Pollution Control District (SJVAPCD) to evaluate the air impacts of the project and is included as Appendix A. The AIA assesses the impacts of the project construction and operational criteria pollutant using the CalEEMod 2016.3.2 emission model.

Impact #3.4.3a – Would the project conflict with or obstruct implementation of the applicable air quality plan?

The project is located within the San Joaquin Valley Air Basin (SJVAB), which and under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAB is designated nonattainment of State and federal health-based air quality standards for ozone and $PM_{2.5}$. The SJVAB is designated nonattainment of State PM_{10}. To meet Federal Clean Air Act (CAA) requirements, the SJVAPCD has multiple air quality attainment plan (AQAP) documents, including:

- 2016 Ozone Plan;
- 2007 PM_{10} Maintenance Plan and Request for Redesignation; and
- 2016 $PM_{2.5}$ Plan.

The SJVAPCD's Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI) thresholds are designed to implement the general criteria for air quality emissions as required in the CEQA Guidelines, Appendix G, Paragraph III (Title 14 of the California Code of Regulations §15064.7) and CEQA (California Public Resources Code Sections 21000 et. al). SJVAPCD's specific CEQA air quality thresholds are presented in Table 3.4.3-1.

Table 3.4.3-1
GAMAQI Thresholds of Significance for Criteria Pollutants

Criteria Pollutant	Threshold (tons/year)
CO	100
ROG	10
NOx	10
SOx	27
PM_{10}	15
$PM_{2.5}$	15

(San Joaquin Air Pollution Control District, 2015)

The proposed project is a residential subdivision (TTM 848) on approximately 54.1 acres and includes 362 single-family dwelling units to be constructed in three phases. Phase 1 will consist of 152 dwelling units, Phases 1 and 2 will consist of 259 dwelling units, Phases 1, 2, and 3 will consist of 362 dwelling units.

The anticipated construction duration for the proposed project is approximately 48 months. Stationary sources that comply or that would comply with Air District Rules and Regulations are generally not considered to have a significant air quality impact.

During construction, the proposed project would be subject to Regulation VIII (Fugitive PM_{10} Prohibition) of the SJVAPCD. The purpose of Regulation VIII is to reduce ambient concentrations of fine particulate matter (PM_{10}) by requiring actions to prevent, reduce or mitigate anthropogenic fugitive dust emissions. Regulation VIII would require fugitive dust emission controls at the construction site such as water application, dust suppressants, reduced vehicle speeds on unpaved roads (SJVAPCD, 2017).

The SJVAPCD Small Project Analysis Level (SPAL) process established review parameters to determine whether a project qualifies as a "small project." A project that is found to be "less than" the established parameters, according to the SPAL review parameters, has "no possibility of exceeding criteria pollutant emissions thresholds."

As shown in Table 3.4.3-2, the proposed project would not exceed the established SPAL limits for a single-family residential project. The project would construct 362 single-family residential units compared to the allowable project size for a single-family residential project, which is 390 units. Based on the above information, this project qualifies for a limited air quality analysis applying the SPAL guidance to determine air quality impacts.

Table 3.4.3-2
Small Project Analysis Level – Units for Housing

Land Use Category – Housing	Project Size (Units)
Single Family	390
Apartment, Low Rise	590
Apartments, High Rise	600
Condominiums, General	590
Condominiums, High Rise	590
Mobile Homes	760
Retirement Community	880

Source: (SJVAPCD, 2017)

Construction and operation of the proposed project would not exceed any established SJVAPCD thresholds; therefore, implementation of the proposed project would not obstruct implementation of an air quality plan. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.3b – Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

The nonattainment pollutants for the SJVAPCD are ozone, PM_{10} and $PM_{2.5}$. Therefore, the pollutants of concern for this impact are ozone precursors, and regional PM_{10}, and $PM_{2.5}$. As discussed above, the thresholds of significance used for determination of emission significance are shown in Table 3.4.3-1 above. The proposed project would create NOx and PM_{10} emissions during construction, which would contribute to the current nonattainment status of these pollutants within the SJVAB. As noted in Impact #3.4.3a, the project's emissions during temporary construction activities would not exceed thresholds.

Operation of the project would also create additional criteria pollutants, particularly as a result of increased mobile emissions in the project area. However, these impacts also would not exceed thresholds. Although the emissions from the proposed project may be under the SJVAPCD CEQA thresholds of 10 tons per year for NOx and 15 tons per year for PM_{10}, CEQA and SJVAPCD's Rule 9510 require that all feasible and reasonable mitigation be applied to the proposed project to reduce air quality impacts from construction and operations.

The General Plan analyzed activities that disturb the soil, such as grading and excavation, infrastructure construction, building demolition, and a variety of construction activities. The General Plan also analyzed operational air quality impacts that would likely occur based on the various land use designations and possible resultant land uses that could occur during buildout of the City.

The General Plan EIR requires that all new development, such as the proposed project, be subject to Best Management Practices to reduce dust and other air pollutant emissions, as well as mandatory compliance with all applicable SJVAPCDs rules and regulations. These rules and regulations include, but are not limited to, Rule 2201 (New and Modified Station Source Review), Rule 4002 (National Emission Standards for Hazardous Air Pollutants), Regulation VIII (Fugitive PM_{10} Prohibitions), and Rule 9510 (Indirect Source Review [ISR]). The construction and operation of the proposed project would also be subject to SJVAPCD's Regulation VIII (Fugitive PM_{10} Prohibitions). Because project construction at the project site would not result in significant emissions for which the SJVAPCD and surrounding air districts are in nonattainment, construction emissions would not result in a cumulatively considerable net increase. Further, as the proposed project would not result in significant operational emissions of criteria pollutants, the proposed project would not contribute to a long-term cumulative increase in criteria pollutants.

With implementation of this mitigation, the project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Impacts would be less than significant.

Construction

The project AIA indicates construction occurring from November 2020 through January 2024 and will be completed in three phases. Project construction emissions of NOx and PM_{10} were calculated according to the Emission Reductions required by Rule 9510, i.e. 20 percent reduction in NOx and 45 percent in PM_{10}. The AIA concluded that the project construction will achieve onsite reductions of 7.5 tons of NOx, and 19.1 tons of PM_{10} (see Appendix A).

The primary source of NOx is off-road diesel construction equipment and on-road diesel emissions during hauling activities. The primary source of PM_{10} is from site preparation and grading activities. The highest construction emissions would occur in 2023 when the construction activities for Phase 3 are assumed to begin, which includes 103 dwelling units. Table 3.4.3-3 shows generated emissions from these activities.

Table 3.4.3-3 shows mitigated emissions during construction do not exceed the SJVAPCD localized emission screening thresholds and would therefore have a less-than-significant impact from localized criteria pollutant emissions. The results include credit for compliance with fugitive dust controls required by SJVAPCD Regulation VIII.

Table 3.4.3-3
Mitigated Construction Emissions

Project	NOx (tons per year)	PM_{10} (tons per year)
Construction Phase 3: 103 DU	2.35	0.077
Project Totals	7.43	0.26
Screening Thresholds	10	15
Exceed SJVAPCD threshold?	No	No

Notes: NO_X = nitrogen oxides, PM_{10} = particulate matter
Source: (SJVAPCD, 2020)

As seen in Table 3.4.3-3, emissions from the project are below the SJVAPCD's thresholds.

Operation

Operational emissions occur over the lifetime of the project and are from two main sources: area sources such as natural gas combustion for space and water heating and motor vehicles, or mobile sources. Operational emissions are presented in Table 3.4.3-4. The results of the analysis show that emissions are below the annual emission thresholds for each pollutant.

Table 3.4.3-4
Mitigated Operational Emissions

Project	NOx (tons per year)	PM_{10} (tons per year)
Operation Phase 1: 152 DU	1.86	1.47
Project Totals	4.06	3.49
Screening Thresholds	10	15
Exceed SJVAPCD threshold?	No	No

Notes: NO_X = nitrogen oxides, PM_{10} = particulate matter
Source: (SJVAPCD, 2020)

The AIA analysis of maximum daily emissions during operation was conducted to determine if NOx and PM_{10} emissions would exceed the daily thresholds for pollutant of concern. The maximum daily operational emissions were assessed assuming full operations in the year 2023. Operational emissions include those generated onsite by area sources such as natural gas combustion and landscape maintenance, and offsite by motor vehicles accessing the project. Most motor vehicle emissions would occur distant from the site and would not contribute to a violation of ambient air quality standards at the project site; therefore, operational emissions only reflect the emissions within a half mile of the project site. The results of the analysis are presented in Table 3.4.3-4. The project would not exceed SJVAPCD daily operational screening thresholds and would result in less-than-significant localized impacts.

Based on information from the SPAL, the proposed project is not expected to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Therefore, the proposed project will have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.3c – Would the project expose sensitive receptors to substantial pollutant concentrations?

The CARB provides guidance for siting sensitive receptors near sources of Toxic Air Contaminants (TAC) emissions (California Air Resources Board, 2005). Sensitive receptors are defined as areas where young children, chronically ill individuals, the elderly, or people who are more sensitive than the general population reside. The following locations are where several sensitive receptors are likely to reside and be affected by substantial pollutant concentrations: schools, hospitals, nursing homes, and daycare centers. It is recommended that sources of air pollution be kept away from sensitive receptors, including recommendations for distances from certain land uses. The Lemoore University Elementary Charter School is approximately 1,925 feet west and the West Hills College campus is located across College Avenue.

The proposed project, because of its residential nature, once constructed is not expected to result in the generation of odors or other hazardous air pollutants. However, during construction of the project, construction activities and equipment may generate emission from construction equipment exhaust. These impacts are localized and temporary in nature and therefore are considered less than significant. The project would not expose sensitive receptors to substantial concentrations of localized PM_{10}, carbon monoxide, diesel particulate matter, hazardous air pollutants, or naturally occurring asbestos, as discussed below.

Hazardous Pollutants or Odors

The GAMAQI guidelines introduce two types of projects that should be assessed when considering hazardous air pollutants (HAPs) which includes: (1) placing a toxic land use in an area where it may have an adverse health impact on an existing sensitive land use and (2) placing a sensitive land use in an area where an adverse health impact may occur from an existing toxic land use. Some examples of projects that may include HAPs are:

- Agricultural products processing;

- Bulk material handling;
- Chemical blending, mixing, manufacturing, storage, etc.;
- Combustion equipment (boilers, engines, heaters, incinerators, etc.);
- Metals etching, melting, plating, refining, etc.;
- Plastics & fiberglass forming and manufacturing;
- Petroleum production, manufacturing, storage, and distribution; and
- Rock & mineral mining and processing.

The proposed project is located on a site that is currently undeveloped land. The proposed project consists of 1,362 single-family homes with all applicable utilities and infrastructure. During the construction period some odors could result from vehicles and equipment using diesel fuels. However, vehicles and equipment using diesel fuels at the proposed project would have to comply with the California Air Resources Board (CARB) guidelines, which limit idling time to five minutes with the Airborne Toxic Control Measure (ATCM). All construction would be temporary.

Additionally, the proposed project is located near other residential or multi-family developments. Residential neighborhoods and multi-family developments are not known to be a source of nuisance odors. The project is not expected to expose sensitive receptors to substantial pollutant concentrations. Therefore, impacts will be less than significant.

The California Air Resources Control Board also recommends avoiding siting new sensitive land uses within 500 feet of a freeway. Highway 41 is located 1,800 feet away to the east of the project site. Therefore, Highway 41 would not result in significant TAC impacts.

As noted in Impact #3.4.3b, the proposed project would not create or expose sensitive receptors to substantial pollutant concentrations or emissions.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.3d – Would the project result in emissions (such as those leading to odors) adversely affecting a substantial number of people?

Sensitive receptors include locations where young children, chronically ill individuals, the elderly, or people who are more sensitive than the general population reside, such as schools, hospitals, nursing homes, and daycare centers. The West Hills College and Lemoore University Elementary Charter School abut western edge of the project site. Although emissions from construction-related vehicles are anticipated during temporary construction activities, the proposed project is not expected to affect these sensitive receptors.

As discussed in Impact #3.4.3c above. The residential nature of this project is not expected to result in the generation of odors or hazardous air pollutants that would affect a substantial number of people. The emissions associated with the construction of the project would be temporary in nature and are not anticipated to result in the generation of a substantial amount of hazardous air pollutants. Therefore, the project will have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact

3.4.4 - BIOLOGICAL RESOURCES

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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?	☐	☒	☐	☐
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?	☐	☒	☐	☐
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?	☐	☐	☐	☒
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?	☐	☒	☐	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Methodology

A reconnaissance-level field survey of the project area was conducted, and a Biological Evaluation Report was prepared for the project, which can be found in Appendix B.

The analysis of potential project impacts was based on the known and potential biotic resources of the project area. Sources of information used in the preparation of this analysis included: (1) the California Natural Diversity Data Base (CNDDB), (2) the Online Inventory of Rare and Endangered Vascular Plants of California, and (3) manuals, reports, and references related to plants and animals of the San Joaquin Valley region (Live Oak Associates, 2020).

The field investigation did not include a wetland delineation or focused surveys for special-status species. The field survey was sufficient to generally describe those features of the project area that could be subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and/or the Regional Water Quality Control Board (RWQCB), and to assess the significance of possible biological impacts associated with development of the project area (Live Oak Associates, 2020).

Discussion

Impacts #3.4.4a – 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?

Four special-status plant species have been documented in the vicinity. These include brittlescale (*Atriplex depressa*), recurved larkspur (*Delphinium recurvatum*), Panache peppergrass (*Lepidiumm jaredii* ssp. album), and California alkali grass (*Puccinellia simplex*). All of these species are considered absent from the project area due to past and ongoing disturbance, the absence of suitable habitat, and/or the project area's being outside of the elevational range of the species. Project-related impacts to these four special-status plant species are considered less than significant under CEQA.

Fourteen regionally occurring special status wildlife species were identified as potentially occurring in the project vicinity. Of these, six were considered to possibly occur, including Western snowy plover (*Charadrius alexandrinus nivosus*), (western burrowing owl (*Athene cunicularia*), San Joaquin kit fox (*Vulpes macrotis mutica*) Swainson's hawk (*Buteo swainsoni*), Tricolor blackbirds (A*gelaius tricolo*) and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). One species, loggerhead shrike (*Lanius ludovicianu*) was observed on the site (Live Oak Associates, 2020). Due to past and ongoing disturbance of the project area and surrounding urban land uses, and the absence of suitable habitat, it is unlikely these species would inhabit the site. However, they are known to occur in the vicinity of the project site and could potentially inhabit the site at any time or individuals could potentially be present from time to time as transient foragers.

No USFWS-designated Critical Habitat units occur on the project site. Critical Habitat for the Buena Vista Lake ornate shrew (*Sorex ornatus relictus*) is located approximately 1.5 miles southwest of the project site. Riparian habitats are defined as vegetative communities that are influenced by a river or stream, specifically the land area that encompasses the water channel and its current or potential floodplain. No riparian habitat occurs on or near the project site. No sensitive natural communities or critical habitats occur on or near the project site.

The potential for special-status species to occur on the site is low; however, a preconstruction survey would need to be completed to ensure there is no evidence of occupation by special-status species on the project site. There is the potential for several special-status or protected wildlife species to be impacted by project activities. Compliance with Mitigation Measures MM BIO-1 through MM BIO-6 would protect, avoid, and minimize impacts to special-status wildlife species. When implemented, these measures would reduce impacts to these species to below significant levels.

MITIGATION MEASURE(S)

MM BIO-1: Prior to ground disturbing activities, a qualified wildlife biologist shall conduct a biological clearance survey between 14 and 30 calendar days prior to the onset of construction. The clearance survey shall include walking transects to identify presence of San Joaquin kit fox, loggerhead shrike, Swainson's hawk, western burrowing owl, yellow-head and tricolor blackbirds, other nesting birds and other special-status species or signs of, and sensitive natural communities. The preconstruction survey shall be walked by no greater than 30-foot transects for 100 percent coverage of the project site and the 50-foot buffer, where feasible. A report outlining the results of the survey shall be submitted to the Lead Agency.

Potential kit fox dens may be excavated provided that the following conditions are satisfied: (1) the den has been monitored for at least five consecutive days and is deemed unoccupied by a qualified biologist; (2) the excavation is conducted by or under the direct supervision of a qualified biologist. Den monitoring and excavation should be conducted in accordance with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (United States Fish and Wildlife Service, 2011).

In addition, impacts to occupied burrowing owl burrows shall be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: (1) the birds have not begun egg laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

MM BIO-2: Prior to ground disturbance activities, or within one week of being deployed at the project site for newly hired workers, all construction workers at the project site shall attend a Construction Worker Environmental Awareness Training and Education Program, developed and presented by a qualified biologist.

The Construction Worker Environmental Awareness Training and Education Program shall be presented by the biologist and shall include information on the life history of wildlife and plant species that may be encountered during construction activities, their legal protections, the definition of "take" under the Endangered Species Act, measures the project operator is implementing to protect the species, reporting requirements, specific measures that each worker must employ to avoid take of the species, and penalties for violation of the act. Identification and information regarding special-status or other sensitive species with the potential to occur on the project site shall also be provided to construction personnel. The program shall include:

- An acknowledgement form signed by each worker indicating that environmental training has been completed; and
- A copy of the training transcript and/or training video/CD, as well as a list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be maintained on site for the duration of construction activities.

MM BIO-3: The following measures shall be implemented to reduce potential impacts to Swainson's hawk: Nesting surveys for the Swainson's hawks shall be conducted in accordance with the protocol outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). If potential Swainson's hawk nests or nesting substrates are located within a half mile of the project site, then those nests or substrates must be monitored for activity on a routine and repeating basis throughout the breeding season, or until Swainson's hawks or other raptor species are verified to be using them. The protocol recommends that the following visits be made to each nest or nesting site: one visit during January 1–March 20 to identify potential nest sites, three visits during March 20–April 5, three visits during April 5–April 20, and three visits during June 10–July 30. A fewer number of visits may be permissible if deemed adequate by the City after consultation with a qualified biologist. To meet the minimum level of protection for the species, surveys shall be completed for at least the two survey periods immediately prior to project-related ground disturbance activities. If Swainson's hawks are not found to nest within the survey area, then no further action is warranted.

If Swainson's hawks are found to nest within the survey area, active Swainson's hawk nests shall be avoided by a half mile during the nesting period, unless this avoidance buffer is reduced through consultation with the CDFW and/or a qualified biologist with expertise in Swainson's hawk issues. If a construction area falls within this nesting site, construction must be delayed until the young have fledged (left the nest). The 2,500-foot radius no-construction zone may be reduced in size, but in no case shall be reduced to less than 500 feet except where a qualified biologist concludes that a smaller buffer area is sufficiently protective. A qualified biologist must conduct construction monitoring on a daily basis, inspect the nest on a daily basis, and ensure that construction activities do not disrupt breeding behaviors.

MM BIO-4: A qualified biologist shall conduct a preconstruction survey on the project site and within 500 feet of its perimeter, where feasible, to identify the presence of the western burrowing owl. The survey shall be conducted between 14 and 30 days prior to the start of construction activities. If any burrowing owl burrows are observed during the preconstruction survey, avoidance measures shall be consistent with those included in the CDFW staff report on burrowing owl mitigation (CDFG 2012). If occupied burrowing owl burrows are observed outside of the breeding season (September 1 through January 31) and within 250 feet of proposed construction activities, a passive relocation effort may be instituted in accordance with the guidelines established by the California Burrowing Owl Consortium (1993) and the California Department of Fish and Wildlife (2012). During the breeding season (February 1 through August 31), a 500-foot (minimum) buffer zone should be maintained unless a qualified biologist verifies through noninvasive methods that either the birds have not begun egg laying and incubation or that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

MM BIO-5: If construction is planned outside the nesting period for raptors (other than the western burrowing owl) and migratory birds (February 15 to August 31), no mitigation shall be required. If construction is planned during the nesting season for migratory birds and raptors, a preconstruction survey to identify active bird nests shall be conducted by a qualified biologist to evaluate the site and a 250-foot buffer for migratory birds and a 500-foot buffer for raptors. If nesting birds are identified during the survey, active raptor nests shall be avoided by 500 feet and all other migratory bird nests shall be avoided by 250 feet. Avoidance buffers may be reduced if a qualified onsite monitor determines that encroachment into the buffer area is not affecting nest building, the rearing of young, or otherwise affecting the breeding behaviors of the resident birds. Because nesting birds can establish new nests or produce a second or even third clutch at any time during the nesting season, nesting bird surveys shall be repeated every 30 days as construction activities are occurring throughout the nesting season.

No construction or earth-moving activity shall occur within a non-disturbance buffer until it is determined by a qualified biologist that the young have fledged (left the nest) and have attained sufficient flight skills to avoid project construction areas. Once the migratory birds or raptors have completed nesting and young have fledged, disturbance buffers will no longer be needed and can be removed, and monitoring can cease.

MM BIO-6: During all construction-related activities, the following mitigation shall apply:

a. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers. 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 the construction or project site.

b. Construction-related vehicle traffic shall be restricted to established roads and predetermined ingress and egress corridors, staging, and parking areas. Vehicle speeds should not exceed 20 miles per hour (mph) within the project site.
c. To prevent inadvertent entrapment of kit fox or other animals during construction, the contractor shall cover all excavated, steep-walled holes or trenches more than two feet deep at the close of each workday with plywood or similar materials. If holes or trenches cannot be covered, one or more escape ramps constructed of earthen fill or wooden planks shall be installed in the trench. Before such holes or trenches are filled, the contractor shall thoroughly inspect them for entrapped animals. All construction-related pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored on the project site shall be thoroughly inspected for wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in anyway. If at any time an entrapped or injured kit fox is discovered, work in the immediate area shall be temporarily halted and USFWS and CDFW shall be consulted.
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 four-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 has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
e. No pets, such as dogs or cats, shall be permitted on the project sites to prevent harassment, mortality of kit foxes, or destruction of dens.
f. Use of anti-coagulant rodenticides and herbicides in project areas 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, as well as additional project-related restrictions deemed necessary by the USFWS and CDFW. If rodent control must be conducted, zinc phosphide shall be used because of the proven lower risk to kit foxes.
g. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative shall be identified during the employee education program and their name and telephone number shall be provided to the USFWS.
h. The Sacramento Fish and Wildlife Office of USFWS and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact can be reached at (559) 243-4014 and R4CESA@wildlifeca.gov.

i. All sightings of the San Joaquin kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed shall also be provided to the Service at the address below.
j. Any project-related information required by the USFWS or questions concerning the above conditions, or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at: Endangered Species Division, 2800 Cottage Way, Suite W 2605, Sacramento, California 95825-1846, phone (916) 414-6620 or (916) 414-6600.
k. If burrowing owls are found to occupy the project site and avoidance is not possible, burrow exclusion may be conducted by qualified biologists only during the non-breeding season, before breeding behavior is exhibited, and after the burrow is confirmed empty through non-invasive methods (surveillance). Replacement or occupied burrows shall consist of artificial burrows at a ratio of one burrow collapsed to one artificial burrow constructed (1:1). Ongoing surveillance of the project site during construction activities shall occur at a rate sufficient to detect burrowing owl, if they return.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.4b – 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?

Designated critical habitat is absent from the project area itself, and the site does not contain wetland or riparian habitat (Live Oak Associates, 2020). Riparian habitat is defined as lands that are influenced by a river, specifically the land area that encompasses the river channel and its current or potential floodplain. The project is not located within a river or an area that encompasses a river or potential floodplain. The proposed project would not have any adverse effect to a riparian habitat.

The project site is highly disturbed and does not provide habitat to maintain these communities. No sensitive natural communities were identified within the project site or buffer area during the biological reconnaissance survey. There are no anticipated impacts to sensitive natural communities as a result of the proposed project.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.4c – 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 United States Army Corps of Engineers (USACE) has regulatory authority over the Clean Water Act (CWA), as provided for by the EPA. The USACE has established specific criteria for the determination of wetlands based upon the presence of wetland hydrology, hydric soils, and hydrophilic vegetation. There are no federally protected wetlands or vernal pools that occur within the project site.

Wetlands, streams, reservoirs, sloughs, and ponds typically meet the criteria for federal jurisdiction under Section 404 of the CWA and State regulatory authority under the Porter-Cologne Water Quality Control Act. Streams and ponds typically meet the criteria for State regulatory authority under Section 1602 of the California Fish and Game Code. There are no features on the project site that would meet the criteria for either federal jurisdiction or State regulatory authority. There would be no impact to federally protected wetlands or waterways or State wetlands or waters.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.4d – 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 proposed project site does not occur within a known migration route, significant wildlife corridor, or linkage area as identified in the Recovery Plan for Upland Species in the San Joaquin Valley. However, the Pacific flyway, one of four major bird migration routes passes over the project area and much of California (Live Oak Associates, 2020).

Wildlife movement corridors are routes that provide shelter and sufficient food supplies to support regular movements of wildlife species. A movement corridor is a continuous geographic extent of habitat that either spatially or functionally links ecosystems across fragmented, or otherwise inhospitable, landscapes. Faunal movement may include seasonal or migration movement, life cycle links, species dispersal, recolonization of an area, and movement in response to external pressures. Movement corridors typically include riparian habitats, ridgelines, and ravines, as well as other contiguous expanses of natural habitats. Movement corridors may be functional on regional, sub-regional, or local scales.

No core areas or Essential Habitat Connectivity areas occur on or near the project site. The project will not restrict, eliminate, or significantly alter wildlife movement corridors, core areas, or Essential Habitat Connectivity areas either during construction or after the project has been constructed. Project construction will not substantially interfere with wildlife movements or reduce breeding opportunities or affect migrating birds or other wildlife.

The project area does not contain features likely to function as a wildlife movement corridor. Future buildout of the site will have no effect on the Pacific flyway; birds using the flyway will continue to do so during and following construction. The project will have no effect on wildlife movement corridors. However, compliance with Mitigation Measures MM BIO-1 through MM BIO-6 would protect, avoid, and minimize impacts to special-status wildlife species. When implemented, these measures would reduce impacts to these species to below significant levels.

MITIGATION MEASURE(S)

Implementation of Mitigation Measures MM BIO-1 through MM BIO-6.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impacts #3.4.4e – Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

In compliance with CEQA, the Lead Agency must consider conformance with applicable goals, objectives, and policies of the General Plans of the County of Kings. Relevant resource conservation goals of the Kings County General Plan include: (1) protecting the Kings River and associated riparian habitat; (2) preserving land that contains important natural plant and animal habitats; (3) maintaining the quality of natural wetland areas; (4) protecting and managing riparian environments as resources; and (5) protecting habitats supporting rare, endangered, or threatened species, providing mitigation measures to protect important plant and wildlife habitats. The project appears to be in compliance with all provisions of County of Kings General Plan polices. No known habitat conservation plans are in effect for the area.

The City of Lemoore does not have any local policies or ordinances protecting biological resources nor an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan. Therefore, there would be no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.4f – 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?

See discussion in Impact #3.4.4-e, above. The project site is not located within any natural community conservation plan area or any other local, regional, or State habitat conservation plan.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

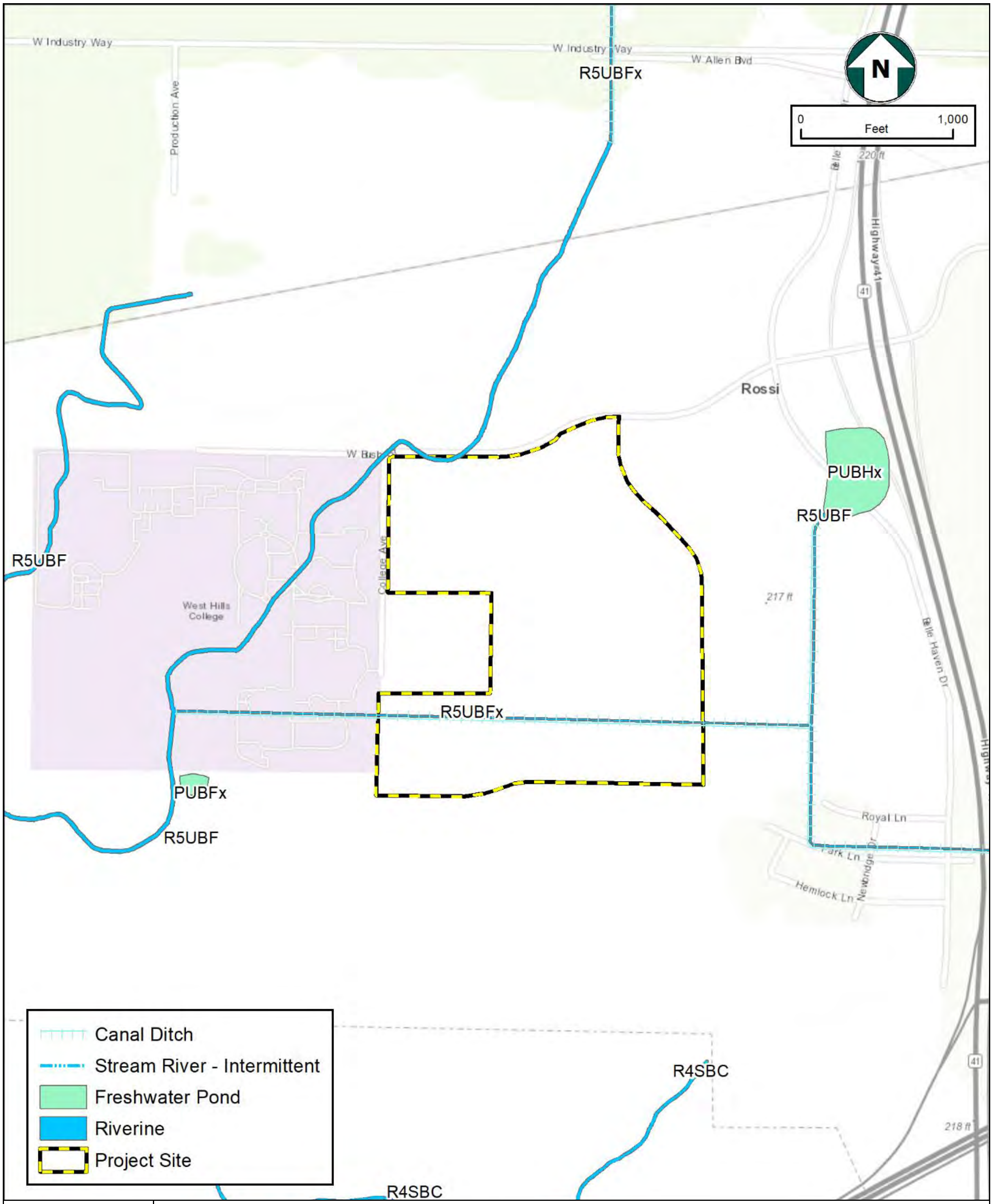

Figure 3.4.4-1
National Wetland Inventory and Hydrologic Information

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.5 - CULTURAL RESOURCES				
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5?	☐	☒	☐	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Discussion

The analysis below is based on a Cultural Resources Inventory prepared for the project (Applied EarthWorks, Inc , 2019), and found in Appendix XX of this document.

Impact #3.4.5a – Would the project cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5?

The City of Lemoore 2030 General Plan states there are currently no buildings or structures listed in the National Register of Historic Places or as California Historic Landmarks. However, there are 37 sites listed as having local historic significance located within the downtown district (City of Lemoore , 2008).

The General Plan provides the following Implementation Measure specific to archaeological resources.

- COS-I-33 - Require that new development analyze and avoid potential impacts to archaeological, paleontological, and historic resources by:
  - Requiring a records review for development proposed in areas that are considered archaeologically or paleontologically sensitive;
  - Determining the potential effects of development and construction on archeological (as required by CEQA);
  - Requiring preconstruction surveys and monitoring during any ground disturbance for all development in areas of historical and archaeological sensitivity; and
  - Implementing appropriate measures to avoid the identified impacts, as conditions of project approval.

A records search of the CHRIS from the Southern San Joaquin Valley Information Center (SSJVIC) at California State University, Bakersfield was conducted to identify previously recorded resources and prior surveys within the project area and surrounding half-mile area. SSJVIC staff examined site records, files, and maps, and also completed searches of the Historic Property Data File, National Register of Historic Places, California Register of Historical Resources, and California Historical Resources databases.

The database search of previous studies conducted within the project area and surrounding half-mile area (RS File No. 19-386) reported no previously recorded cultural resources in the project area and only one resource, a segment of the historic Southern Pacific Railroad (P-16-00122) within a half mile of the project area (Applied EarthWorks, Inc , 2019).

A pedestrian survey of the project site was conducted and found no evidence of prehistoric or historic-era archaeological sites, features, or isolated artifacts on the ground surface. No historic-era built environment resources were identified in the project area. Additionally, agricultural activities and urban development have disturbed the immediate ground surface in the project area; however, unknown cultural resources may be discovered during construction activities. In order to account for unanticipated discoveries and the potential to impact previously undocumented or unknown resources, mitigation measures are recommended. With the implementation of MM CUL-1 through MM CUL-3, impacts under cultural resources would be less than significant.

MITIGATION MEASURE(S)

MM CUL-1: Prior to any ground disturbance, a surface inspection of the site shall be conducted by a Tribal Monitor. The Tribal Cultural staff shall monitor the site during initial grading activities. The Tribal Cultural Staff shall provide preconstruction briefings to supervisory personnel and any excavation contractor, which will include information on potential cultural material finds and, on the procedures, to be enacted if resources are found. Prior to any ground disturbance, the applicant shall offer the Santa Rosa Rancheria Tachi Yokut Tribe the opportunity to provide a Native American Monitor during ground disturbing activities during both construction and decommissioning. Tribal participation would be dependent upon the availability and interest of the tribe.

MM CUL-2: In the event that cultural resources are discovered during construction or decommissioning. Operations shall stop within 100 feet of the find, and a qualified archeologist shall determine whether the resource requires further study. The qualified archaeologist shall determine the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with §15064.5 of the CEQA Guidelines. Mitigation measures may include avoidance, preservation in-place, recordation, additional archaeological testing, and data recovery, among other options. Any previously undiscovered resources found during construction within the project area shall be recorded on appropriate Department of Parks and Recreation forms and evaluated for significance. No further ground disturbance shall occur in the immediate vicinity of the discovery until approved by the qualified archaeologist.

The City along with other relevant or Tribal officials, shall be contacted upon the discovery of cultural resources to begin coordination on the disposition of the find(s). Treatment of any significant cultural resources shall be undertaken with the approval of the Lead/Permitting Agency.

MM CUL-3: Upon coordination with the City any archaeological artifacts recovered shall be donated to an appropriate Tribal custodian or a qualified scientific institution where they would be afforded applicable cultural resources laws and guidelines.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

Impact #3.4.5b – Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?

See discussion of Impact #3.4.5a, above.

MITIGATION MEASURE(S)

Implement MM CUL-1 through MM CUL-3.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

Impact #3.4.5c – Would the project disturb any human remains, including those interred outside of formal cemeteries?

Human remains are not known to exist within the project area. However, construction would involve earth-disturbing activities, and it is still possible that human remains may be discovered, possibly in association with archaeological sites. MM CUL-4 has been included in the unlikely event that human remains are found during ground-disturbing activities. Impacts would be less than significant with implementation of mitigation.

MITIGATION MEASURE(S)

MM CUL-4: If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code. The specific protocol, guidelines, and channels of communication outlined by the Native American Heritage Commission, in accordance with Section 7050.5 of the Health and Safety Code, Section 5097.98 of the Public Resources Code (Chapter 1492, Statutes of 1982, Senate Bill 297), and Senate Bill 447 (Chapter 44, Statutes of 1987), shall be followed. Section 7050.5(c) shall guide the potential Native American involvement, in the event of discovery of human remains, at the direction of the county coroner.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.6 - ENERGY				
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?	☐	☐	☒	☐
b. Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

Discussion

The following analysis is based on project data provided by the applicant, the Small Project Analysis Level Assessment (SPAL) and available energy resource consumption data.

Impact #3.4.6a – 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?

Construction

Energy demand during the construction phase would result from the transportation of materials, construction equipment, and construction worker vehicle trips. Construction equipment includes scrapers, motor graders (blades), vibrators and static compactors, 3,500-gallon water trucks, track excavators, graders, off-highway trucks, rubber-tired loaders and backhoes, concrete trucks tractors, concrete extrusion machine, cranes, forklifts, generator sets, pavers, air compressors and rollers. The project would comply with the SJVAPCD requirements regarding the limitation of vehicle idling, and the use of fuel-efficient vehicles and equipment, to the extent feasible. Using a typical fuel efficiency of 5.85 miles per gallon, the delivery of building materials is expected to require approximately 49,000 gallons of diesel per construction phase. The project will not use natural gas during the construction phase. Compliance with standard regional and local regulations, the project would minimize fuel consumption during construction. By complying with standard regional and local regulations, the project would minimize fuel consumption during construction. Construction related fuel consumption is not expected to result in inefficient, wasteful, or unnecessary energy use. Thus, construction-related fuel consumption at the project would not result in inefficient, wasteful, or unnecessary energy use.

Post-Construction

The project will use a variety of energy-saving components to reduce energy consumption. These include, but are not limited to dual-pane glass, low-flow toilets, tankless water heaters, and Energy Star rated insulation and appliances. In addition, solar panels, while not standard, are available for installation on the house rooftops to offset electrical costs and reduce the impact to the Lemoore PG&E electrical grid.

The project will comply with all applicable standards and building codes included in the 2019 California Green Building Standards Code. Therefore, the project would have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.6b – Would the project conflict with or obstruct a State or local plan for renewable energy or energy efficiency?

The project must comply with Title 24, Chapter 4 of the California Green Building Standards Code for residential development and Part 6, of the California Energy Code (CEC) the California Code of Regulations (CCR), Title 20 with adoptions of the California Energy Commission (California Building Standards Commission, 2019).

The project would result in the construction of a residential subdivision consisting of 362 single-family residences. Energy saving strategies will be implemented where feasible to reduce the project's energy consumption during the construction and post-construction phases. Strategies being implemented include those recommended by the California Air Resources Board (CARB) that may reduce both the project's construction energy consumption, including diesel anti-idling measures, light-duty vehicle technology, usage of alternative fuels such as biodiesel blends and ethanol, and heavy-duty vehicle design measures to reduce energy consumption. Additionally, as outlined in the SJVAPCD's GAMAQI, the project includes recommendations to reduce energy consumption by shutting down equipment when not in use for extended periods, limiting the usage of construction equipment to eight cumulative hours per day, usage of electric equipment for construction whenever possible in lieu of diesel or gasoline powered equipment, and encouragement of employees to carpool to retail establishments or to remain onsite during lunch breaks.

The project will also incorporate energy saving design features as outlined in the 2019 California Green Building Standards Code and the City of Lemoore Building Codes - Chapter 8-1-J-1 Green Code in order to reduce energy consumption and costs. As noted above, energy efficiency design features include, skylights, dual-pane glass windows with window treatments and by the use of renewable energy. Energy efficient lighting and low flow plumbing infrastructure will also be installed in each home. Based on this analysis, the project would be consistent and not conflict with or obstruct a State of local plan related to renewable energy or energy consumption. Impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

3.4.7 - GEOLOGY AND SOILS

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including Liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
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 offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☒	☐	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☒	☐

f.	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

Discussion

The analysis below is based on the Geotechnical Engineering Investigation completed for the project site by Krazan & Associates and found in Appendix D in this document.

Impact #3.4.7a(i) – Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving 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?

According to the City of Lemoore 2030 General Plan, there are no known major fault systems within Lemoore (City of Lemoore, 2008). The greatest potential for geologic disaster in the City is posed by the San Andres Fault, which is located approximately 60 miles west of the Kings County boundary line with Monterey County (Krazan & Associates, 2018).

The project site is not located within an Alquist-Priolo Earthquake Fault Zone. Per the Department of Conservation, California Geologic Survey Regulatory Maps (California Department of Conservation, 2020).

There are no active fault traces in the project vicinity. Accordingly, the project area is not within an Earthquake Fault Zone (Special Studies Zone) and will not require a special site investigation by an Engineering Geologist (Krazan & Associates, 2018). By adhering to the most recent California Building Standard Codes, the project will have a less-than-significant impact of endangering people and structures associated with this project. Therefore, the project would have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.7a(ii) – Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

See response to Impact #3.4.6a.

Secondary hazards from earthquakes include ground shaking/rupture, seiche, landslides, liquefaction, and subsidence. Since there are no known faults within the immediate area, ground shaking/rupture from surface faulting should not be a potential problem. Seiche and landslides are not potential hazards in the area. Lastly, deep subsidence problems may be low to moderate according to the conclusions of the Five County Seismic Safety Element. However, there are no known occurrences of structural or architectural damage due to deep subsidence in the Lemoore area (Krazan & Associates, 2018).

According to the Seismic Safety Map contained within the Health and Safety Element of the 2035 Kings County General Plan (Figure HS-2, page HS-10), the project site is located within an area designated as Zone V1 or Valley Zone 1, which is identified as the area of least expected seismic shaking by the Kings County Seismic Zone Description in the 2035 General Plan (Kings County, 2010). The potential for ground shaking is discussed in terms of the percent probability of exceeding peak ground acceleration (% g) in the next 50 years (Kings County, 2010).

The project is required to design residential buildings and associated infrastructure to withstand substantial ground shaking in accordance with all applicable State law and applicable codes included in the California Building Code (CBC) Title 24 for earthquake construction standards and building standards code including those relating to soil characteristics (California Building Standards Commission, 2019). The project shall adhere to all applicable local and State regulations to reduce any potentially significant impacts to structures resulting from strong seismic ground shaking at the project site. Therefore, project impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***

Impact #3.4.7a(iii) - Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

See discussion of Impact #3.4.7a(i) above.

The potential magnitude/geographic extent of expansive liquefaction erosion was deemed ‘negligible’ and its significance ‘low’ throughout the City (City of Lemoore, 2012). Liquefaction is possible in local areas during a strong earthquake or other seismic ground shaking, where unconsolidated sediments coincide with a high-water table.

Structures constructed as part of the project would be required by State law to be constructed in accordance with all applicable IBC and CBC earthquake construction standards, including those relating to soil characteristics. Adherence to all applicable regulations would avoid any potential impacts to structures resulting from liquefaction at the project site.

Test boring indicated that free groundwater was encountered at depths of approximately nine to 14 feet during our subsurface investigation. The subject site and soil conditions, with the exception of the loose surface soils, expansive nature of the clayey soils, and existing development, appear to be conducive to the development of the project. The surface soils have a loose consistency. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated. Accordingly, it is recommended that these surface soils be recompacted (Krazan & Associates, 2018).

The project includes the construction of 362 single-family residences, therefore, the potential for liquefaction is considered significant. Implementation of Best Management Practices (BMP) contained in Appendix B-Earthwork Specifications of the Geotechnical Engineering Report prevent potential liquefaction in the future. Based on this analysis, the project would have a less-than-significant impact exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure including liquefaction. Structures constructed as part of the project would be required by State law to be constructed in accordance with all applicable IBC CBC, Title 24 construction standards. Adherence to all applicable regulations would reduce or avoid any potential impacts to structures resulting from liquefaction at the project site and impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.6a(iv) – Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

The land is relatively flat with no significant topological features. As such, there is no potential for rock fall and landslides to impact the project in the event of a major earthquake, as the area has no dramatic elevation changes. Secondary hazards from earthquakes include ground shaking/rupture, seiche, landslides, liquefaction, and subsidence. Since there are no known faults within the immediate area, ground shaking/rupture from surface faulting should not be a potential problem. Seiche and landslides are not hazards in the area either. Lastly, deep subsidence problems may be low to moderate according to the conclusions of the Five County Seismic Safety Element. However, there are no known occurrences of structural or architectural damage due to deep subsidence in the Lemoore area (Krazan & Associates, 2018).

The project site currently consists of undeveloped land and the surrounding area is essentially flat. The site's topography would not change substantially as a result of project development since the site is essentially flat in nature from previous activities with no surrounding slopes and it is not considered to be prone to landslides. The project would not expose people or structures to potential substantial adverse effects from landslides. Therefore, there would be no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***

Impact #3.4.7b – Would the project result in substantial soil erosion or the loss of topsoil?

There are two types of soil found within the project site, which are Vanguard sandy loam and Goldberg loam. The construction of 362 single-family residences is not expected to subject the site to any extreme erosion problems.

Construction activities associated with the proposed project will disturb surface vegetation and soils during construction and would expose these disturbed areas to erosion by wind and water. To reduce the potential for soil erosion and loss of topsoil, the project would comply with the State Water Resources Control Board's (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit (No. 2012-0006-DWQ) during construction. Under the NPDES, the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) are required for construction activities that would disturb an area of one acre or more. A SWPPP must identify potential sources of erosion or sedimentation as well as identify and implement Best Management Practices (BMPs) that ensure reduce erosion. Typical BMPs intended to control erosion include sandbags, retention basins, silt fencing, street sweeping, etc.

Mitigation Measure MM GEO-1 requires the approval of a SWPPP to comply with the NPDES General Construction Permit. The project will comply with all the grading requirements as outlined in Title 24 and Appendix J of the California Building Code (UpCodes, 2016). The project is not expected to result in substantial soil erosion or the loss of topsoil with the incorporation of Mitigation Measure MM GEO-1.

Once constructed, the project will have both impermeable surfaces as well as permeable surfaces. Impermeable surfaces would include roadways, driveways and building sites. Permeable surfaces would include front and back yards, any landscaped areas and open space. Overall, development of the project would not result in conditions where substantial surface soils would be exposed to wind and water erosion.

MITIGATION MEASURE(S)

MM GEO-1: Prior to issuing of grading or building permits, the project applicant shall submit to the City: (1) the approved Storm Water Pollution Prevention Plan (SWPPP) and (2) the Notice of Intent (NOI) to comply with the General National Pollutant Discharge Elimination System (NPDES) from the Central Valley Regional Water Quality Control Board. The requirements of the SWPPP and NPDES shall be incorporated into design specifications and construction contracts. Recommended Best Management Practices for the construction phase may include the following:

- Stockpiling and disposing of demolition debris, concrete, and soil properly;
- Protecting existing storm drain inlets and stabilizing disturbed areas;
- Implementing erosion controls;
- Properly managing construction materials; and
- Managing waste, aggressively controlling litter, and implementing sediment controls.

Evidence of the approved SWPPP shall be submitted to the Lead Agency.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.7c – 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 offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

As previously discussed, the site soils are considered stable in that there is not a potential of on or offsite landslides, lateral spreading, subsidence or collapse. However, as discussed in Impact #3.4.7a(iii), the project site soils are subject to potential liquefaction (Krazan & Associates, 2018). The project is potentially located on a geologic unit or soil that could potentially result in liquefaction.

All structures would be subject to all applicable City of Lemoore Building Ordinances, as well as all applicable IBC and CBC earthquake construction standards, including those relating to soil characteristics. compliance with the Best Management Practices (BMP) contained in Appendix B-Earthwork Specifications to prevent potential liquefaction in the future, would reduce project impacts to a less than significant.

MITIGATION MEASURES

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.7d – Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Expansive clay soils are subject to shrinking and swelling due to changes in moisture content over the seasons. These changes can cause damage or failure of foundations, utilities, and pavements. During periods of high moisture content, expansive soils under foundations can heave and result in structures lifting. In dry periods, the same soils can collapse and result in settlement of structures.

The subject site and soil conditions, with the exception of the loose surface soils, expansive nature of the clayey soils, and existing development, appear to be conducive to the development of the project. The surface soils have a loose consistency. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated. Accordingly, it is recommended that these surface soils be recompacted. (Krazan & Associates, 2018)

Compliance with the policies of the City of Lemoore Development Code, the CBC would reduce potential site-specific impacts to less-than-significant levels.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.7e – Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?

Refer to *Section 3.4.19 - Utilities and Service Systems*.

The proposed project does not include the development or use of septic tanks or alternative wastewater disposal systems as the project would connect to the City's existing sewer system.

MITIGATION MEASURES

None are required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.7f – Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Geological records of the region and those prepared for the General Plan found no evidence of paleontological resources or unique geological features in Lemoore. Additionally, the Lemoore area has sedimentary rocks of tertiary and quaternary age, which are younger rocks of continental origin (Krazan & Associates, 2018). The project is in an area identified as having geologic features that are less than 150 years before present age, which is considered to have low potential for paleontological resources (Meyer, Jack et al, 2010).

However, there is a possibility that future ground disturbing activities could cause damage to, or destruction of, previously undiscovered paleontological resources or unique geologic features. Implementation of MM GEO-2 would reduce potential impacts to a less-than-significant level. In addition, the Lemoore General Plan policies and guidelines direct the City to require construction to stop immediately if paleontological resources are uncovered during grading or other onsite excavation activities, until appropriate mitigation is implemented. Therefore, with MM GEO-2, the project will have a less-than-significant impact.

MITIGATION MEASURE(S)

MM GEO-2: If any paleontological resources are encountered during ground disturbance activities, all work within 25 feet of the find shall halt until a qualified paleontologist as defined by the Society of Vertebrate Paleontology Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (2010), can evaluate the find and make recommendations regarding treatment. Paleontological resource materials may include resources such as fossils, plant impressions, or animal tracks preserved in rock. The qualified paleontologist shall contact the Natural History Museum of Los Angeles County or other appropriate facility regarding any discoveries of paleontological resources.

If the qualified paleontologist determines that the discovery represents a potentially significant paleontological resource, additional investigations and fossil recovery may be required to mitigate adverse impacts from project implementation. If avoidance is not feasible, the paleontological resources shall be evaluated for their significance. If the resources are not significant, avoidance is not necessary. If the resources are significant, they shall be avoided to ensure no adverse effects, or such effects must be mitigated. Construction in that area shall not resume until the resource appropriate measures are recommended or the materials are determined to be less than significant. If the resource is significant and fossil recovery is the identified form of treatment, then the fossil shall be deposited in an accredited and permanent scientific institution. Copies of all correspondence and reports shall be submitted to the Lead Agency.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant. with mitigation incorporated***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact

3.4.8 - GREENHOUSE GAS EMISSIONS

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b. Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Discussion

There have been significant legislative and regulatory activities that directly and indirectly affect climate change and GHGs in California. The primary climate change legislation in California is AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing GHG emissions in California. GHGs, as defined under AB 32, include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and Nitrogen trifluoride. AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. The California Air Resources Board is the State agency charged with monitoring and regulating sources of emissions of GHGs that cause global warming in order to reduce emissions of GHGs. SB 32 was signed by the Governor in 2016, which would require the State Board to ensure that statewide greenhouse gas emissions are reduced to 40 percent below the 1990 level by 2030.

Although construction of the proposed project would result in temporary emissions of GHGs, the project as a whole is not expected to generate greenhouse gas emissions, either directly or indirectly that may have a significant impact on the environment. The project GHG emissions are primarily from mobile source activities.

The SJVAPCD Small Project Analysis Level (SPAL) process established review parameters to determine whether a project qualifies as a "small project." A project that is found to be "less than" the established parameters, according to the SPAL review parameters, has "no possibility of exceeding criteria pollutant emissions thresholds."

As shown in Table 3.4.3-2, the proposed project would not exceed the established SPAL limits for a single-family residential project. The project would construct 362 single-family residential units compared to the allowable project size for a single-family residential project, which is 390 units. Based on the above information, this project qualifies for a limited GHG analysis applying the SPAL guidance to determine air quality impacts.

Impact #3.4.8a – Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

The SJVAPCD has adopted the Final Draft Staff Report, addressing Greenhouse Gas Emissions Impacts under the California Environmental Quality Act (November 5, 2009), that included a recommended methodology for determining significance for stationary source projects and traditional development projects (such as residential, commercial, or industrial projects).

The proposed project would emit greenhouse gases such as carbon dioxide (CO_2), methane, and nitrous oxide from the exhaust of equipment and the exhaust of vehicles for residents, customers, and delivery trips. The increased rate of greenhouse gas emissions would not be considered cumulatively significant per the California Global Warming Solutions Act of 2006. As stated in the SJVAPCD's GAMAQI, projects whose emissions have been reduced or mitigated, consistent with Assembly Bill 32- California Global Warming Solutions Act of 2006, should be considered to have a less-than-significant impact on global climate change.

The City of Lemoore 2030 General Plan has analyzed greenhouse gas emissions for the City based on land use designations, including emissions for areas designated as Medium Density Residential and Neighborhood Commercial. Construction and operational greenhouse gas emissions as a result have already been analyzed in the General Plan EIR. The project will comply with GHG emission reduction polices, such as incorporating green building design principles, sustainable site design, landscaping and maintenance, the use of energy efficient appliances and lighting, etc. The use of renewable energy such as PV solar is encouraged in the City. With implementation of these and other applicable City policies, as well as mandatory compliance with the applicable SJVAPCD rules and regulations, project GHG emissions will be reduced to less-than-significant levels.

MITIGATION MEASURES

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***

Impact #3.4.8b – Would the project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

See response to Impact #3.4.8a.

The proposed project falls within the jurisdiction of the SJVAPCD and the City of Lemoore 2030 General Plan. Both of these entities take into account baseline emissions inventory for light industrial uses for the City of Lemoore. Because the proposed project will be consistent with the applicable General Plan land use designations of Low-Density Single Family (LDSF) and Low-Medium Density Residential (LMDR), it can be concluded that the proposed project would not conflict with the approved General Plan.

Because the proposed project is consistent with the General Plan, the project construction and operational GHG emissions as a result have already been analyzed in the General Plan EIR. With implementation of applicable General Plan policies, as well as mandatory compliance with all applicable SJVAPCD rules and regulations, the project GHG emissions will be reduced to less-than-significant levels. Therefore, the project will not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

MITIGATION MEASURES

No mitigation required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.9 - Hazards and Hazardous Materials				
Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
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?	☐	☒	☐	☐
c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐
d. Be located on a site that 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?	☐	☐	☐	☒
e. For a project located within 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 result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires??	☐	☐	☐	☒

Discussion

Impacts #3.4.9a, #3.4.9b, and #3.4.9c – Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; 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 or emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

The proposed project could include the transport and use of small amounts of liquid waste, including cleaning fluids, dust palliative, herbicides, and solvents. Some solid hazardous waste, such as welding materials and dried paint, may also be generated during construction. These materials would be transported to the project site during construction, and any hazardous materials that are produced as a result of the construction of the project would be collected and transported away from the site. During construction of the project, material safety data sheets for all applicable materials present at the site would be made readily available to onsite personnel. During construction activities, non-hazardous construction debris would be generated and disposed of in local landfills. Sanitary waste would be managed using portable toilets located at a reasonably accessible onsite location.

The West Hills College and Lemoore University Elementary Charter School campuses are located in close proximity to the project site's western edge. However, the use of hazardous materials will be limited in quantities and duration, and if spilled, would be very localized. The proposed project would not emit hazardous emissions or involve handling hazardous or acutely hazardous materials substances. The transport use and storage of hazardous materials would be required to comply with all applicable State and federal regulations, such as requirements that spills would be cleaned immediately, and all wastes and spills control materials would be properly disposed of at approved disposal facilities.

Residential construction generally uses fewer hazardous chemicals or uses chemicals in relatively small quantities and concentrations as compared to commercial or industrial uses. In addition, once the project is completed, the chemicals used would include minor quantities of pesticides/rodenticides, fertilizers, paints, detergents, and other cleaners.

Once constructed, the use of such materials such as paint, bleach, etc., are considered common for residential developments and would be unlikely for such materials to be stored or used in such quantities that would be considered a significant hazard.

Mitigation Measure MM GEO-1 requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP) which includes a list of BMPs to be implemented on the site both during construction to minimize potential impacts from accidental spills. Compliance with the SWPPP and all local, State, and federal regulations regarding hazardous materials, impacts associated with the use or accidental spill of hazardous materials would be less than significant.

MITIGATION MEASURE(S)

Implement MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

Impact #3.4.9d – Would the project be located on a site that 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?

An online search was conducted of Cortese List to identify locations on or near the project site. The search indicated that there are no hazardous or toxic sites in the vicinity (within one mile) of the project site (Cal EPA, 2019). Currently, there are no hazardous wastes landfill sites within Lemoore. The Kings Waste & Recycling Authority maintains a permanent household hazardous waste facility in the City of Hanford. Lemoore residents can make use of this facility through free household hazardous waste disposal services available at collection sites in the City. The City collects e-waste, battery, and used oil for disposal (City of Lemoore, 2008).

According to EnviroStor, there are no hazardous waste and substances sites in the vicinity of the project site. The closest site is the Self Help Enterprises Tract No. 656 (ID No. 16150001), which is a "voluntary cleanup" site and is approximately 3.4 miles south-east of the project site (CA Dept of Toxic Substances, 2020). The proposed project site is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and would therefore not create a significant hazard to the public or the environment.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact.***

Impact #3.4.9e – For a project located within 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 result in a safety hazard or excessive noise for people residing or working in the project area?

There are no public airports within two miles of the project site. The Lemoore NAS runways are located 6.7 miles to the west of the project site. The closest public airport is the Hanford Municipal Airport, located approximately 11 miles east of the project. The project is not within an airport land use compatibility plan area. There is no adopted airport land use plan that includes the City of Lemoore.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.9f –Would the project impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?

The 2015 Kings County Emergency Operations Plan (EOP) establishes emergency procedures and policies and identifies responsible parties for emergency response in the County, and includes the incorporated City of Lemoore (Kings County, 2015). The EOP includes policies that would prevent new development from interfering with emergency response of evacuation plans. The project will comply with all local regulations related to the construction of new development that is consistent with the EOP.

The General Plan also provides guidance to City staff in the event of extraordinary emergency situation associated with natural disaster and technological incidents (City of Lemoore , 2008). The project would also comply with the appropriate local and State requirements regarding emergency response plans and access. The proposed project would not inhibit the ability of local roadways to continue to accommodate emergency response and evacuation activities. The proposed project would not interfere with the City's adopted emergency response plan; therefore, there would be no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.9g – Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

The majority of the City is considered to have either little or no threat or a moderate threat of wildfire. Only one percent of the area within Lemoore city boundaries currently has a high threat of wildfire. Wildfire hazard present in the Planning Area should decrease as vacant parcels become developed (City of Lemoore , 2008).

Applicable General Plan policies:

- SN-I-13. Ensure Fire Department personnel are trained in wildfire prevention, response and evacuation procedures.

- SN-I-14. Continue the City's Weed Abatement Program administered by the Volunteer Fire Department to reduce fire hazards before the fire season.
- SN-I-15. Enforce the Uniform Fire Code through the approval of construction plans and final occupancy permits.

The Lemoore City Volunteer Fire Department, located approximately 2.5 miles away, would provide fire protection services to the project. The proposed project site is in an unzoned area of the Kings County Fire Hazard Severity Zone Map Local Responsibility Area (LRA) (Cal Fire, 2006). However, Cal Fire has determined that portions of the City of Lemoore are categorized as a Moderate Fire Hazard Severity Zone in LRA. The project site is not within a wildland area nor is there within the vicinity of the project site. Construction activities and the project is not expected to increase the risk of wildfires on and adjacent to the project site. The General Plan includes policies that would protect the project and the community from fire dangers. These include the installation of fire safety devices in all homes that meet required fire standards. In addition, developers are required to pay impact fees that offset the impact of residential development on public services such as fire protection (see also the discussion in Impact #3.4.15a(i)).

The project will comply with all applicable State and local building standards as required by local fire codes, as well as impact fees to support additional fire protection services The project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Therefore, there would be no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.10 - HYDROLOGY AND WATER QUALITY				
Would the project:				
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality?	☐	☒	☐	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
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:				
i. Result in substantial erosion or siltation on or offsite?	☐	☒	☐	☐
. ii. Substantially increase the rate of amount of surface runoff in a manner which would result flooding on or offsite?	☐	☒	☐	☐
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?	☐	☒	☐	☐
iv. Impede or redirect flood flows?	☐	☒	☐	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

Discussion

Impact #3.4.10a – Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Project construction would cause ground disturbance that could result in soil erosion or siltation and subsequent water quality degradation offsite, which is a potentially significant impact. Construction-related activities would also involve the use of materials such as vehicle fuels, lubricating fluids, solvents, and other materials that could result in polluted runoff, which is also a potentially significant impact. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling and grading activities could result in increased erosion and sedimentation to surface waters. However, the potential consequences of any spill or release of these types of materials are generally minimal due to the localized, short-term nature of such releases. The volume of any spills would likely be relatively small because the volume in any single vehicle or container would generally be anticipated to be less than 50 gallons.

As noted in Impact #3.4.9b, accidental spills or disposal of potentially harmful materials used during construction could possibly wash into and pollute surface water runoff. Mitigation Measure MM GEO-1 requires the preparation and implementation of a SWPPP to comply with the Construction General Permit requirements.

With implementation of Mitigation Measure MM GEO-1, the project would not violate any water quality standards or degrade groundwater quality, and impacts would be less than significant.

MITIGATION MEASURE(S)

Implement Mitigation Measure MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10b – Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The project site is located within the South Fork Kings Groundwater Sustainability Agency (GSA), Basin ID No. 5-022.12 "exclusive local agency" per Water Code §10723(c). In compliance with the Sustainable Groundwater Management Act (SGMA), a Groundwater Sustainability Plan (GSP) was submitted by the GSA to the Department of Water Resources (DWR), but it is not yet certified. The proposed project would construct 362 single-family dwelling units, which is below the 500 residential unit threshold requiring a Water Supply Assessment pursuant to State Bill 610. The City also adopted an Urban Water Management Plan (UWMP) in 2017 (City of Lemoore, 2017). This document is a planning tool that was created to help generally guide the actions of urban water suppliers in successfully preparing for potential water supply disruptions and issues. It provides a framework for long-term water planning and informs the public of a supplier's plans for long-term resource planning that ensures adequate water supplies for existing and future demands.

The City currently utilizes local groundwater as its sole source of municipal water supply. The City's municipal water system extracts its water supply from underground aquifers via six active groundwater wells within the city limits. The City maintains four ground-level storage reservoirs within the distribution system, with a total capacity of 4.4 million gallons (MG) (City of Lemoore, 2017). The groundwater basin underlying the City is the Tulare Lake Basin as defined in the Department of Water Resources Bulletin 118 for construction and operation would come from the City of Lemoore's existing water system.

The project's expected water usage was calculated using the following assumptions. A person is estimated to use approximately 60 gallons per day (gpd) of water (Grace Communication Foundation, 2019). It was assumed that a typical family household consists of four people. Based on this estimate, the project is anticipated to use approximately 31.7 million gallons (60 gpd x 4 people x 365 days x 362 homes), or 97.3 acre feet (AF) of water annually.

Per the City's 2015 UWMP, the City's existing system has a total supply capacity of 21,674,000 gallons per day with an average day demand of 8,769,000 gallons (City of Lemoore, 2017). As the project site is currently zoned for residential and mixed use development, the General Plan has adequately analyzed the water needed to meet the increased water demand. The proposed project will not substantially deplete aquifer supplies or interfere substantially with groundwater recharge or significantly alter local groundwater supplies.

Based on the calculated amount of water used, the proposed project is not expected to result in a substantial decrease of groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. Therefore, the project will have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.10c(i) – 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, in a manner that would result in substantial erosion or siltation onsite or offsite?

The rate and amount of surface runoff is determined by multiple factors, including the following: topography, the amount and intensity of precipitation, the amount of evaporation that occurs in the watershed and the amount of precipitation and water that infiltrates to the groundwater. The proposed project would alter the existing drainage pattern of the site, which would have the potential to result in erosion, siltation, or flooding on or offsite. However, there are no streams or rivers located on the project site. The disturbance of soils onsite during construction could cause erosion, resulting in temporary construction impacts. In addition, the placement of permanent structures onsite could affect drainage in the long-term. Impacts from construction and operation are discussed below.

As discussed in Impact #3.4.10a. above, potential impacts on water quality arising from erosion and sedimentation are expected to be localized and temporary during construction. Construction-related erosion and sedimentation impacts as a result of soil disturbance would be less than significant after implementation of an SWPPP (see Mitigation Measure MM GEO-1) and BMPs required by the NPDES. No drainages or other water bodies are present on the project site, and therefore, the proposed project would not change the course of any such drainages.

Existing drainage pattern of the site and area would be affected by project development because of the increase in impervious surfaces at the site. The project design includes natural features such as landscaping and vegetation that would allow for the percolation of stormwater. However, there will be an addition in impervious surfaces (houses, driveways, roadways, etc.), which could increase the potential for stormwater runoff and soil erosion. The project includes an existing retention basin, which will be expanded. Overflow would go west to the area the City has rights to spread water per its Storm Drain Master Plan. The project would also connect to existing City stormwater sewer infrastructure. The project will comply with all applicable local building codes and regulations in order to minimize impacts during construction and post-construction of the project. With implementation of MM GEO-1, impacts that would result in substantial erosion or siltation on or offsite is less than significant.

MITIGATION MEASURE(S)

Implement MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10c(ii) – 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 substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?

See also Impact #3.4.10c(i), above. The project site is flat, and grading would be minimal. The topography of the site would not change because of grading activities, and it does not contain any water features, streams or rivers. The project would develop significant areas of impervious surfaces that could significantly reduce the rate of percolation at the site or concentrate and accelerate surface runoff in comparison to the baseline condition.

However, an existing retention basin is incorporated into TTM 848, which will be expanded. Overflow would go west to area the City has rights to spread water per its Storm Drain Master Plan. The BMPs associated with the SWPPP would prevent flooding onsite or offsite. Therefore, the project would not substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or offsite. With implementation of Mitigation Measure MM GEO-1, impacts would be less than significant

MITIGATION MEASURE(S)

Implement MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

Impact #3.4.10c(iii) – 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 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?

Please see Impact #3.4.10c(i)-c(ii), above. The BMPs associated with the SWPPP would prevent sources of polluted runoff. Therefore, the project would not otherwise alter existing drainage patterns that cause runoff water to exceed the capacity of existing stormwater drainage systems or create polluted runoff. With implementation of Mitigation Measure MM GEO-1, impacts would be less than significant.

MITIGATION MEASURE(S)

Implement MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

Impact #3.4.10c(iv) – 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 impede or redirect flood flows?

As discussed above in Impact #3.4.10a through c(iii), construction activities could potentially degrade water quality through the occurrence of erosion or siltation at the project site.

Construction of the project would include soil-disturbing activities that could result in erosion and siltation, as well as the use of harmful and potentially hazardous materials required to operate vehicles and equipment. The transport of disturbed soils or the accidental release of potentially hazardous materials could result in water quality degradation. The project would be required comply with the NPDES Construction General Permit. A SWPPP would be prepared to specify BMPs to prevent construction pollutants as required by MM GEO-1. The proposed project would not otherwise substantially degrade water quality. Therefore, the project will have a less-than-significant impact.

MITIGATION MEASURE(S)

Implement MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.10d – Would the project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

The project site is not located near the ocean or a steep topographic feature (i.e., mountain, hill, bluff, etc.). Additionally, there is no body of water within the vicinity of the project site. The proposed project's inland location makes the risk of tsunami highly unlikely. The probability of a seiche occurring in the City of Lemoore is considered negligible. Furthermore, given the geologic context at the proposed project site and the absence of pollutants, if such an event were to occur, the likelihood of it exposing project structures or people to a significant risk is considered low.

As shown in Figure 3.4.10-1, the project is not located within a FEMA 100-year floodplain. According to FEMA, the site is located in an area of minimal flood hazard and has a less than 0.2 percent chance of an annual flooding. As such, the project would not place housing within a 100-year flood hazard area as mapped on a federal flood hazard boundary or flood insurance rate map or other flood hazard delineation map.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.10e – Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

See response to Impact #3.4.10b above. Based on this estimate, the project is anticipated to use approximately 31.7 million gallons or 97.3 acre feet (AF) of water annually.

Per the City's 2015 UWMP, the City's existing system has a total supply capacity of 21,674,000 gallons per day with an average day demand of 8,769,000 gallons (City of Lemoore, 2017). As the project site is currently zoned for residential and mixed use development, the General Plan has adequately analyzed the water needed to meet the increased water demand. The proposed project will not substantially deplete aquifer supplies or interfere substantially with groundwater recharge or significantly alter local groundwater supplies. Therefore, the project will have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

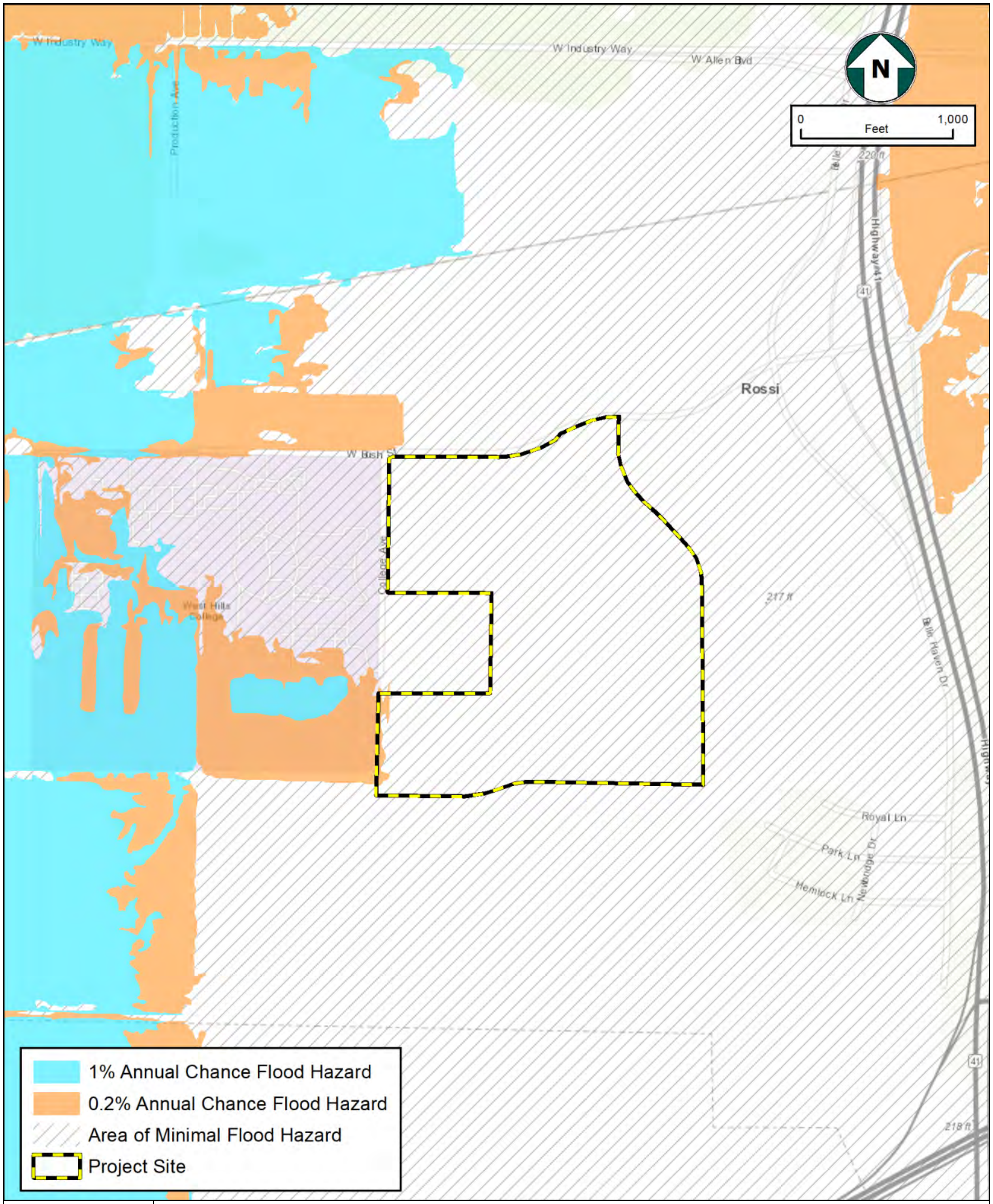

Figure 3.4.10-1
100-Year Floodplain

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.11 - LAND USE AND PLANNING				
Would the project:				
a. Physically divide an established community?	☐	☐	☐	☒
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?	☐	☐	☒	☐

Discussion

Impact #3.4.11a – Would the project physically divide an established community?

The project site is located on the southeast corner of Bush Avenue and College Avenue within Assessor's Parcel Numbers (APNs) 023-510-040 and 023-480-031, and totals approximately 54.1 acres in area. The project is located on the western edge of the City, and is surrounded by undeveloped land to the north, east, and south, and the West Hills College, and Lemoore University Elementary Charter School to the west. Therefore, the project will not physically divide an established community.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.11b – 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 proposed project is a 362 single-family dwelling unit residential subdivision that requires approval of a General Plan Amendment (GPA No. 2020-02), Zone Change (ZMA No. 2020-02), Major Site Plan Review (SPR No. 2020-01), Planned Unit Development (PUD No. 2020-01), and TTM 848. The discretionary approvals required for the project will include reviews and comments from responsible agencies, and from several City departments to ensure compliance with all applicable, plans, policies, regulations, standards, and conditions of approval. With approval of the discretionary actions, the project will be consistent with the City's General Plan and Zoning Ordinance and comply with local and State building codes and requirements.

Changes in State law to Government Code Section 66300(b)(1), effective January 1, 2020, prohibit cities from approving a general plan amendment or zone change that would result in the reduction in intensity of land use. The 362 housing units on 54.1 acres would be less than was anticipated in the Lemoore General Plan Housing Element. Therefore, the project was modified to include an upzoning of 23.4 acres of land at the southeast corner of Bush Street and College Drive. Table 3.4.11-1 illustrates as proposed, there would be no net loss of housing units with this change in General Plan land use designations and zoning.

Table 3.4.11-1
Housing Density Analysis

Zone Name	Acres	Housing Element Realistic Density	HE Lower	HE Mod	HE Above Mod	Total Housing
EXISTING PLANNED DENSITY						
Mixed Use east of pipeline	7.28	9.00	66	0	0	**66**
Parks & Recreation/ Ponding Basin	8.16	0.00	0	0	0	**0**
Low Density Residential	29.41	4.50	0	66	66	**132**
Low-Medium Density Residential	20.12	9.00	0	91	91	**182**
Mixed Use west of pipeline	11.05	9.00	99	0	0	**99**
Parks & Recreation/ Ponding Basin	1.03	0.00	0	0	0	**0**
TOTAL PER CURRENT PLANNED DESIGNATIONS	77.05		165	157	157	**479**
PLANNED DENSITY AFTER GENERAL PLAN AMENDMENT ONLY						
Low Density Residential east of pipelines	49.10	4.50	0	110	110	**220**
Low Medium Density Residential east of pipeline	15.87	9.00	0	71	71	**142**
Medium Density Residential west of pipeline	8.38	14.00	117	0	0	**117**
Neighborhood Commercial west of pipeline	3.70	0.00	0	0	0	**0**
TOTAL PER REVISED PLANNED DESIGNATIONS	77.05		117	181	181	**479**
DENSITY WITH PROPOSED TENTATIVE MAP AFTER GENERAL PLAN AMENDMENT						
Low Density Residential east of pipeline (as proposed)	49.10	5.57	0	111	148	**259**
Low Medium Density Residential east of pipeline	15.87	6.49	0	103	0	**103**

Zone Name	Acres	Housing Element Realistic Density	HE Lower	HE Mod	HE Above Mod	Total Housing
Medium Density Residential west of pipeline	8.38	14.00	117	0	0	**117**
Neighborhood Commercial west of pipeline	3.70	0.00	0	0	0	**0**
TOTAL AS PROPOSED BY TENTATIVE MAP	77.05		117	214	148	**479**

Table 3.4.11-1 also illustrates that the proposed GPA by itself will not result in a net increase or loss of housing units and TTM 848 will also result in no net loss of housing units. Therefore, the project will not conflict with any land use plan, policy, or regulation.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.12 - Mineral Resources				
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Discussion

Impact #3.4.12a – 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 City of Lemoore and the surrounding area have no mapped mineral resources, and no regulated mine facilities (City of Lemoore, 2008). Additionally, per the California Department of Conservation - Geologic Energy Management Division (CalGEM, formerly the Division of Oil, Gas, and Geothermal Resources [DOGGR]), there are no active, inactive, or capped oil wells located within the project site, and it is not within a DOGGR-recognized oilfield (see Figure 3.4.12-1). Therefore, there would be no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

Impact #3.4.12b – 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 designated for mineral and petroleum resources activities by the City of Lemoore General Plan. The project site and surrounding lands are zoned for residential, mixed-use, and community facilities. No mining occurs in the project area or in the nearby vicinity. The closest active oil well is located in the unincorporated community of Westhaven, approximately eight miles south-west of the project site. There are no mineral extraction activities that will be conducted in the future as a result of the project. The project would not 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 and would therefore have no impact.

MITIGATION MEASURES

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

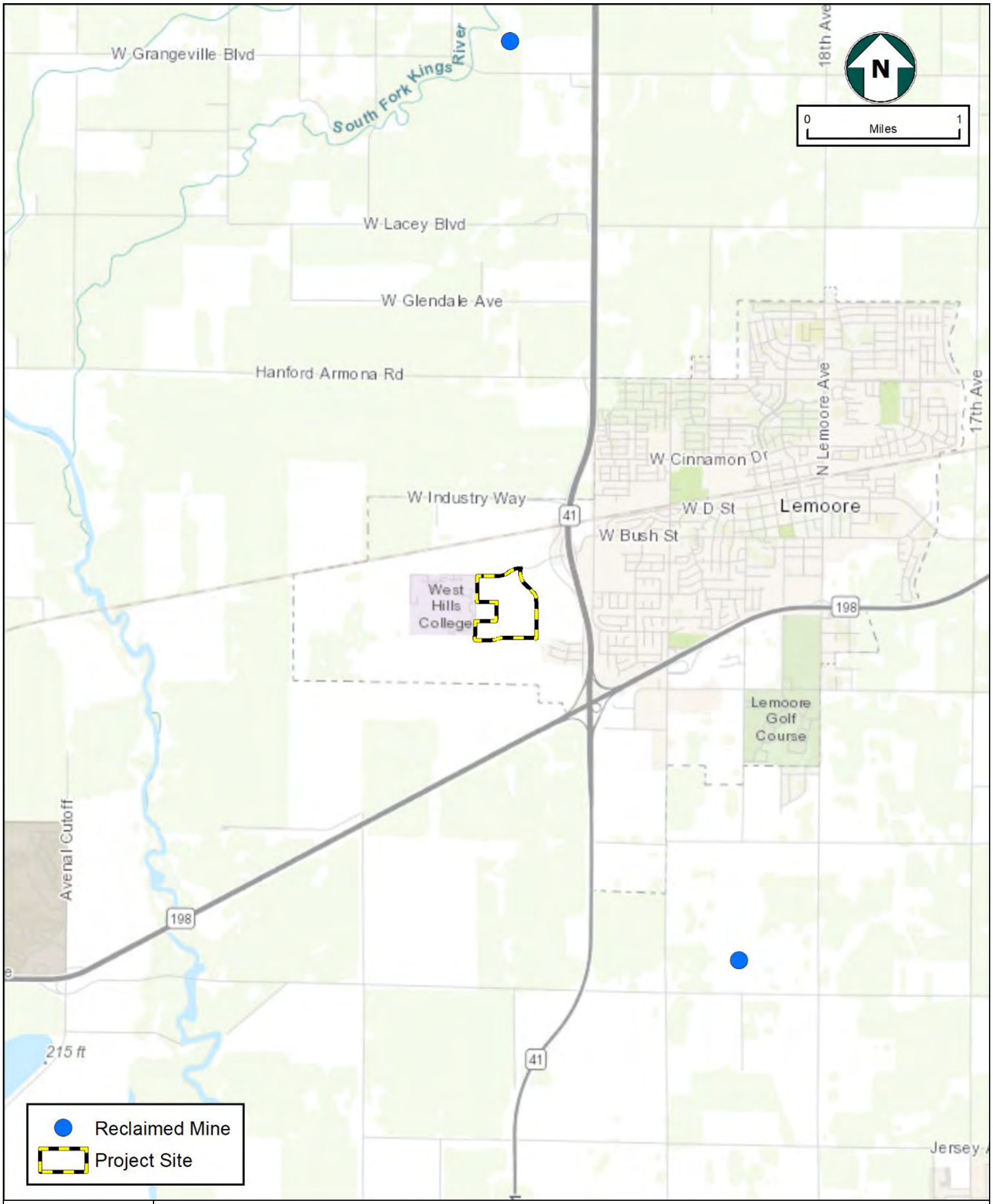

Figure 3.4.12-1
Reclaimed Mines

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.13 - NOISE				
Would the project result in:				
a. Exposure of persons to, or generate, noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	☐	☐	☒	☐
b. Exposure of persons to or generate excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. For a project located within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

Discussion

Impact #3.4.13a – Would the project result in exposure of persons to, or generate, noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?

The City of Lemoore 2030 General Plan Section 8.6-Noise, provides the following noise exposure criteria used to evaluate proposed residential development within the City of Lemoore:

- The California Building Code requires that habitable rooms in multi-family dwellings with an exterior DNL or CNEL noise exposure above 60 dB receive an acoustical analysis to ensure a maximum interior noise level of 45 dB;
- State and federal agencies set the 65 dB exterior CNEL noise exposure as the maximum normally acceptable level above which residential uses may be incompatible if not acoustically treated;
- The State Office of Noise Control in coordination with the Governor's Office of Planning and Research has published guidelines showing residential noise compatibility "Conditionally Acceptable" in areas of DNL or CNEL noise exposure between 55 dB and 70 dB, and "Normally Unacceptable" in areas between 70 dB and 75 dB3.

The General Plan provides the following general noise implementing policies specific to residential development.

- SN-I-35. Require that all new residential development achieve noise level reductions to meet the land use compatibility standards through acoustical design and construction of the building elements:
  - Residential building designs must be based upon a minimum interior design noise level reduction of 40 dB in all habitable areas (i.e., garages, storage areas, etc. are excepted). The 40 dB criteria must provide a minimum constructed noise level reduction of 35 dB;
  - Residential building designs must also be based upon a minimum design noise level reduction of 45 dB in all bedrooms. The 45 dB criteria must provide a minimum constructed noise level reduction of 40 dB.
- SN-I-36. Establish standards for the basic elements of noise reduction design for new dwellings exposed to DNL above 65 dB (anticipated for areas west of SR-41), including the following:
  - All facades must be constructed with substantial weight and insulation;
  - Sound-rated windows providing noise reduction performance similar to that of the façade must be included for habitable rooms;
  - Sound-rated doors or storm doors providing noise reduction performance similar to that of the façade must be included for all exterior entries;
  - Acoustic baffling of vents is required for chimneys, fans and gable ends;
  - Installation of a mechanical ventilation system affording comfort under closed-window conditions is required; and
  - To meet the highest noise level reduction requirements, it will likely be necessary to use double-stud construction, double doors, and heavy roofs with ceilings of two layers of gypsum board on resilient channels.
- SN-I-37. Prohibit construction materials and methods that do not provide enough noise insulation to ensure compliance with compatibility standards, including:
  - Premanufactured housing and mobile homes built with framing less than 2 x 4 inches;
  - Facades using aluminum, vinyl or other exterior siding weighing less than 5 psf;
  - Façade construction without insulation;
  - Flat roofs without an interstitial cavity space or with a space less than 10 inches (i.e., no monolithic T&G roof/ceiling systems);
  - Jalousie or other lightweight or poor-sealing window systems;
  - Packaged terminal air-conditioning (PTAC) units (i.e., through-the-wall air conditioning).
- SN-I-38. Require that all residential building designs, for sites where the CNEL will exceed 65dBA, include supporting information for City review and approval

demonstrating that an acoustical design providing the necessary noise level reduction has been prepared by a Board Certified Acoustical Engineer for each dwelling unit prior to construction. Elements of this acoustical review process shall include:

  - A letter by a Board-Certified Engineer approving the acoustical design of each dwelling unit (or group of units, if identical), submitted to the Lemoore Building Department with building permit applications. This letter must be received and approved prior to the issuance of a building permit; and
  - Following construction, a letter by the Board Certified Engineer showing noise level reduction test results for a minimum of two habitable areas within each dwelling unit (or group of units, if identical), submitted to the Lemoore Building Department for review and approval prior to the issuance of an occupancy permit.

- SN-I-44. Require noise from permanent mechanical equipment to be reduced by soundproofing materials and sound-deadening installation.
- SN-I-45. Minimize vehicular and stationary noise sources and noise emanating from temporary activities, such as those arising from construction work.

There are nearby residences approximately 0.25 miles to the southeast, and other sensitive receptors, i.e., Lemoore University Elementary Charter School and the West Hills College to the west of the project.

Construction-related noise levels and activities will be temporary and intermittent. The proposed project will generate noise from the following construction equipment: graders, bulldozers, tractors, loaders and loaded trucks, excavators, graders, scrapers, forklifts, generators, cranes, pavers, rollers, compactors and air compressors. Additionally, traffic and the various other noises generally associated with construction activities will be temporary and only take place during daylight hours. In addition, the construction-related noise will be intermittent and cease once the proposed project is completed.

Project construction would generate temporary increases in noise levels. Title 5, Chapter 6 of the City's Municipal Code establishes regulations and enforcement procedures for noise generated in the City. The regulations do not apply to the operation on days other than Sunday of construction equipment or of a construction vehicle, or the performance on days other than Sunday of construction work, between the hours of 7:00 a.m. and 8:00 p.m., provided that all required permits for the operation of such construction equipment or construction vehicle or the performance of such construction work have been obtained from the appropriate City department (Lemoore Municipal Code 5-6-1-C.4).

The General Plan has objectives to minimize residential development noise levels. The proposed project would comply with all regulations, standards and policies within the City's General Plan and Municipal Code. Once constructed, the project will increase traffic on local roadways. Residential activities could also result in an increase in ambient noise levels in the immediate project vicinity. Activities that could be expected to generate noise include cars entering and exiting the development, as well as mechanical systems related to heating, ventilation, and air conditioning systems located on residential buildings. However, noise emanating from residences would be similar to those generated by the nearby existing residential and educational development and would not be of a level that exceeds thresholds.

Therefore, the project would not result in the exposure of persons to or generate noise levels more than standards established in a local general plan or noise ordinance or applicable standards of other agencies. Impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.13b – Would the project result in exposure of persons to or generate excessive groundborne vibration or groundborne noise levels?

The proposed project is expected to create temporary ground-borne vibration as a result of the construction activities (during site preparation and grading). According to the U.S. Department of Transportation, Federal Railroad Administration, vibration is sound radiated through the ground. The rumbling sound caused by the vibration is called ground-borne noise. The ground motion caused by vibration is measured as particle velocity in inches per second and is referenced as vibration decibels (VdB). The background vibration velocity level in residential areas is usually around 50 VdB. A list of typical vibration-generating equipment is shown in Table 3.4.13-1.

Table 3.4.13-1
Different Levels of Ground-borne Vibration

Vibration Velocity Level	Equipment Type
94 VdB	Vibratory roller
87 VdB	Large bulldozer
87 VdB	Caisson drilling
86 VdB	Loaded trucks
79 VdB	Jackhammer
58 VdB	Small bulldozer

Source: (Federal Transit Administration , 2006)
Note: 25 feet from the corresponding equipment

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people.

Typical outdoor sources of perceptible ground-borne vibration are construction equipment and traffic on rough roads. For example, if a roadway is smooth, the ground-borne vibration from traffic is rarely perceptible.

Typically, ground-borne vibration generated by construction activity attenuates rapidly with distance from the source of the vibration. Therefore, vibration issues are generally confined to distances of less than 500 feet (U.S. Department of Transportation, 2005). There are schools located within the surrounding area of the proposed project site. Potential sources of temporary vibration during construction of the proposed project would be minimal and would include transportation and use of equipment to the site.

Construction activity would include various site preparation, grading, in fabrication, and site cleanup work. Construction would not involve the use of equipment that would cause high ground-borne vibration levels such as pile-driving or blasting.

Once constructed, the proposed project would not have any components that would generate high vibration levels. Thus, construction and operation of the proposed project would not result in any vibration and impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.13c – 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?

The urban expansion westward is unavoidable given the City's desire to preserve farmland in the north and east and to support the West Hills College with compatible land uses. To minimize noise conflicts, the City has taken steps to ensure appropriate noise mitigation measures are in place before allowing development, including measures such as the noise level reduction (NLR) criteria in Air Installations Compatible Use Zones (AICUZ)instructions aircraft noise policies.

The City Zoning Ordinance established a Naval Air Station Lemoore (NASL) overlay zone as provided in this article shall apply to those properties as designated on the zoning map, generally west of State Route 41 and south of the city limits, which fall in the military influence area (MIA) (Ord. 2013-05, 2-6-2014) (City of Lemoore, 2019). The project is within the Overlay III area, which experiences aircraft noise less than 65 decibels (<65 dB CNEL). Development located within Overlay III of the NASL overlay zone are required to be constructed so as to attain an indoor noise level of 45 decibels (45 dB CNEL). New residences shall be constructed in accordance with noise attenuation standards of the City adopted building code AICUZ.

As a condition of approval, prior to recordation of the final tract map, an avigation easement on all lots will be created. Such easement shall identify that the property is near a military installation subject to high aircraft noise, low level aircraft, aircraft tests, and/or other military related issues within overlays II and III (Ord. 2013-05, 2-6-2014) (City of Lemoore, 2019).

MITIGATION MEASURES

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less- than Significant Impact	No Impact
3.4.14 - POPULATION AND HOUSING				
Would the project:				
a. Induce substantial 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)?	☐	☐	☒	☐
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

Impact #3.4.14a – Would the project induce substantial 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 project could induce a slight population growth in the area because it includes the construction of 362 single-family dwelling units. However, the potential for population growth is not substantial relative to the total population of the City of Lemoore. The project is planned to be constructed from 2020 through 2024 and will be completed in three phases. According the California Department of Finance estimate, the City's population was 26,257 in 2019. The City anticipates a 3.1 percent annual increase in population, with an estimated population of 34,719 in 2025 and 47,115 by 2035 (City of Lemoore, 2017).

The proposed project is comprised of 362 residences; using the average household size of 4.5 people, the project will house approximately 1,629 people and be within the range of projected growth within the City.

Therefore, the minimal population growth resulting from the project will be absorbed over a three-year timeframe and in three phases, which will result in less-than-significant impacts.

The project proposed to complete the following roadway improvements:

- Semas Drive – new alignment, located to the east of the project; also known as Semas Avenue. Semas Drive is identified in the General Plan Circulation Element as a new connection/realignment.

- Pedersen Street – located to the south of the project; also known as Pedersen Avenue or Pedersen Street. This street is also identified in the General Plan Circulation Element as a new connection/realignment.
- College Avenue – extension from current terminus to Pedersen Street; also known as College Drive. College Drive is identified in the General Plan Circulation Element as a new connection/realignment, as well as being widened to four travel lanes.

The roadway improvements are offsite improvements that will be completed in compliance with applicable General Plan and Municipal Code requirements. The Lemoore General Plan includes policies to limit development only to areas inside an urban boundary around the city. Any growth inducement could only occur on lands that are designated and have been evaluated for urban development. Therefore, the impact would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.14b – Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

The proposed project would not require demolition of any housing, as the project site is currently undeveloped. Therefore, there would be no need to construct replacement housing elsewhere. There would be no impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

There would be ***no impact***.

3.4.15 - PUBLIC SERVICES

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 to other performance objectives for any of the public services:				
i. Fire protection?	☐	☐	☒	☐
ii. Police protection?	☐	☐	☒	☐
iii. Schools?	☐	☐	☒	☐
iv. Parks?	☐	☐	☒	☐
v. Other public facilities?	☐	☐	☒	☐

Discussion

Impact #3.4.15a(i) – 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 to other performance objectives for any of the public services – fire protection?

The Lemoore Volunteer Fire Department (LVFD) has operated as an all-volunteer department since 1921. The LVFD includes one Chief, two Assistant Chiefs, four Crew Captains, seven Engineers, eleven Emergency Medical Technicians, one paid part-time Secretary, and one paid full-time maintenance worker. The department covers an area of approximately nine square miles, with Mutual Aid Agreements with Kings County Fire, Hanford City Fire and the Naval Air Station Lemoore.

Table 3.4.15-1
Fire Service Existing and Future Demand

	Existing (2006)	Demand Buildout (2030)
Staffing	35 volunteers	72 volunteers
Facilities	2	3

(City of Lemoore , 2008)

Construction and operation of the proposed project would not be expected to result in an increase in demand of fire protection services leading to the construction of new or physically altered facilities. Fire suppression support is provided by the City of Lemoore Volunteer Fire Department (LVFD), which has two fire stations and the closest station to the project site is located at 210 Fox Street, approximately 1.95 miles east of the project site.

The proposed project would result in the construction of 362 single-family dwelling units and associated on and offsite improvements. The project will increase the local population by approximately 1,629 residents and add additional streets. The project may result in significant environmental impacts related to acceptable service ratios, response times, or to other performance objectives fire protection services.

The City of Lemoore will ensure that construction activities would be in accordance with local and State fire codes. Fire protection services are adequately planned for within the City's General Plan through policies to ensure the City maintains Fire Department performance and response standards by allocating the appropriate resources. The project applicant is responsible for constructing any infrastructure needed to serve the project and pay the appropriate impact fees, which would reduce impacts to fire protection to less-than-significant levels.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.15a(ii) – 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 to other performance objectives for any of the public services – police protection?

The Police Department has a staff of 31 sworn peace officers and seven civilian staff members. There are 30 vehicles assigned to the department.

The Police Department currently operates at a ratio of 1.33 officers per thousand residents, which is lower than the Western U.S. average of 1.5 officers per thousand residents reported by the Federal Bureau of Investigation. Average response times in 2006 averaged between 2.1 to 6.1 minutes depending on the priority type. Response times and the ability of the Police Department to provide acceptable levels of service are contingent on increasing staffing levels, sworn and civilian, consistent with resident population increase and the population of visitors, merchants, schools, and shoppers with the department's service area.

Table 3.4.15-2
Police Service Existing and Future Demand

	Existing (2006)	Demand Buildout (2030)
Sworn Officers	31	64
Population	23,390	48,250

(City of Lemoore , 2008)

The City's police station is located at 657 Fox Street, approximately two miles northeast of the project site. The project will increase the local population by approximately 1,629 residents and add additional streets into the police patrol network. The project may result in significant environmental impacts related to acceptable service ratios, response times, or to other performance objectives police protection services. However, to reduce impacts to public protection services, the project developer is required to pay appropriate impact fees related to police protection and is responsible for constructing any infrastructure needed to serve the project. Therefore, impacts on police protection services would therefore be considered less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant.***

Impact #3.4.15a(iii) – 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 to other performance objectives for any of the public services – schools?

Buildout of the General Plan will result in the addition of 8,020 households (single family and multi-family), with an additional population of approximately 24,860. Student generation factors by household type shown in Table 3.4.15-3 are used to calculate future enrollment. School size assumptions for households in the Planning Area are as follows:

- K- 6: 750 students per school
- 6- 8: 800 students per school
- 9- 12: 1800 students per school

Table 3.4.15-3
Student Generation Factors

	Household Type	
Type	**Single Family**	**Multi-family**
Elementary School (K-6)	0.354	0.320
Middle School (7-8)	0.088	0.070
High School (9-12)	0.183	0.117
Total	**0.625**	**0.507**

Source: Lemoore Union Elementary School District and Lemoore Union High School District, 2006.

Government Code Section 65996 requires statutory developer fees as the exclusive means of considering and mitigating impacts on school facilities. The developer will pay appropriate impact fees at time building permits issuance. Therefore, the impact would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.15a(iv) – 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 to other performance objectives for any of the public services – parks?

Future parkland in Lemoore will come primarily from two sources:

- Neighborhood and community parks provided as a result of dedication by developers in new development areas; and
- Other parkland provided through City acquisitions or contributions by public and private sources.

The number of parks and open spaces allocated under the General Plan, as shown is larger than is required under current City Park Standards and the Quimby Act. This is in response to the wish of Lemoore residents to have greater access to recreation facilities and a higher quality of life.

The parkland goal will be achieved through parkland dedications in new subdivisions, at a ratio of five acres per thousand residents, and additional parkland at one acre per thousand residents, to be acquired by the City through private and public funding sources and through impact fees. The system of parks and recreational facilities will be geographically distributed throughout the City. With full buildout of the General Plan, 96 percent of Lemoore residents will live within one-quarter mile of a neighborhood park or one-half mile of a community park (City of Lemoore , 2008).

The proposed project is dedicating 1.06 acres of open space for recreation on the site for use by the residents and in lieu fees, in compliance with the goals, policies, and implementation measures of the General Plan and Lemoore City Municipal Code Title 9, Chapter 7, Article N. Therefore, the project would have a less-than-significant impact to the City park system.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.15a(v) – 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 to other performance objectives for any of the public services – other public facilities?

Community facilities are the network of public and private institutions that support the civic and social needs of the population. They offer a variety of recreational, artistic, and educational programs and special events. New community facilities are not specifically sited on the General Plan Land Use Diagram. Small-scale facilities are appropriately sited as integral parts of neighborhoods and communities, while existing larger-scale facilities are generally depicted as public/semi-public land use, as appropriate (City of Lemoore , 2008).

The proposed project does not include any impacts to other public facilities such as libraries, hospitals or emergency medical facilities. The proposed project would comply with the goals, policies, and implementation measures of the General Plan.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

3.4.16 - RECREATION

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. 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?	☐	☐	☒	☐
b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐

Discussion

Impact #3.4.16a – 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?

Currently, the Parks and Recreation Department of the City of Lemoore maintains approximately 88 acres of parkland, which excludes the City-owned municipal golf course. The City's ponding basins, including the one adjacent to West Hills College, provide an additional 38 acres of open space. The City's current park standard for public parkland is five acres of parkland per 1,000 residents. With a population of 25,585 residents in 2015, the City currently provides approximately five acres of parkland per 1,000 residents.

Currently, there is a joint use agreement between the Lemoore Union Elementary and High School Districts and the City to share facilities after school hours. School fields and facilities, however, are not included as part of park land calculations.

As stated in Impact #3.4.15a(iv)-(v) the proposed project is dedicating 1.06 acres of open space for recreation on the site for use by the residents and in lieu fees, in compliance with the goals, policies, and implementation measures of the General Plan and Lemoore City Municipal Code Title 9, Chapter 7, Article N. Therefore, the project would not increase the use of existing parks or the need to construct or expand existing recreational facilities.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.16b – Would the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

The project does not require the construction of any new recreational facilities. As stated in Impact #3.4.15a(iv)-(v) the proposed project is dedicating 1.06 acres of open space for recreation on the site for use by the residents and in lieu fees, in compliance with the goals, policies, and implementation measures of the General Plan and Lemoore City Municipal Code Title 9, Chapter 7, Article N. Therefore, it would not generate an adverse physical effect on the environment.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact

3.4.17 - TRANSPORTATION AND TRAFFIC

Would the project:

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a.	Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☒	☐	☐
b.	Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?	☐	☒	☐	☐
c.	Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d.	Result in inadequate emergency access?	☐	☐	☒	☐

Discussion

A Traffic Impact Study (TIS) was prepared for this project (ND Engineering, PC, 2019), and is included in Appendix E. The Traffic Study was prepared using trip generation and design hour volumes calculated using the Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition, Volume 2, 2017.

Impact #3.4.17a – Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

The project study area for the analysis of traffic impacts extends along Bush Street from College Avenue (west) to 19 ½ Avenue (east). The project TIS analyzes six intersections for two time periods, weekday AM and PM peak hour of the street. To analyze the traffic impacts resulting from the build out of the project, 15 scenarios were evaluated. Time frames included in the 15 scenarios are: Existing, Existing Plus Approved/Pending/Proposed Projects (approximately 2022), and 2035. Appendix A of the project TIS contains a description of the methodology used.

All level of service analyses along Bush Street for intersections west of Belle Haven Drive is dependent on Bush Street operating under normal conditions. Bush Street provides the only access to the project and land uses west of Belle Haven, including West Hills College, until a secondary access is provided via either an extension of College Avenue north across the

Union Pacific Railroad tracks to Hanford-Armona Road or a new Marsh Drive at SR 198 and 21st Avenue interchange. These additional access points are shown as planned improvements needed to accommodate existing and future land use in the City of Lemoore 2030 General Plan but are not specifically discussed in the City of Lemoore Development Impact Fee Program.

Transit

The Kings Area Rural Transit (KART) operates two transit routes in the study area. Route 12, KART Transit Center to Skyline and Union, has stops at Bush and Belle Haven and West Hills College (WHC). The route operates Monday through Friday with three a.m. and two p.m. stops starting around 8:10 a.m. and stopping at 5:00 p.m. Route 20, KART Transit Center to WHC, likewise has stops at Bush and Belle Haven and WHC. This route operates Monday through Friday from approximately 6:10 a.m. to 10:40 a.m. with 30-minute headways.

Bike

A Class 1 bike path is located along the south side of Bush Street between College Avenue and Belle Haven Drive. Class 1, shared use paths, are non-motorized facilities, paved or unpaved, physically separated from motorized vehicular traffic by an open space or barrier. Additional bike facilities are planned for Bush Street east and west of the current bike path, College Avenue, Semas Avenue (new alignment), Pederson Street, 19 ½ Avenue, the Union Pacific Railroad alignment, and the trail and gas pipeline easement that runs through the project site.

Roadways

Table 3.4.17-1 describes the Existing (2018) street system in the study area including the street classification, number of lanes, and the posted speed limits.

Table 3.4.17-1
Description of Existing (2018) Street System

Street	Classification	No. of Lanes (2-dir)	Posted Speed Limit (mph)
Bush Street	Arterial	2-3	25-40
College Avenue	Arterial	2	25
Belle Haven Drive	Arterial/Collector	2	40
SR 41	Freeway	4	65
19 ½ Avenue	Collector	2	35

2-dir = two directional mph – miles per hour SR = State Route

The City of Lemoore does not have an adopted level of service standard, however, per the General Plan most traffic studies are using a LOS "D" as their standard for traffic impact study purposes. Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities.

Intersections that are currently operating below the adopted level of service standards are shown bolded in 3.4.17-2. As shown, the majority of the study intersections are currently operating at or above the appropriate level of service standard in the Existing (2018) scenario. However, the Bush Street at SR 41 southbound (SB) ramp intersection SB approach is operating at a LOS F in the AM peak hour which is below the appropriate adopted level of service standard.

Table 3.4.17-2
Existing (2018) Traffic Conditions Analysis
Intersection Weekday Level of Service

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay[1] (secs)	LOS	Delay[1] (secs)
Bush Street at College Drive				
• NB Approach	B	13.9	B	10.5
Bush Street at Bell Haven Drive	C	23.2	B	12.3
Bush Street at SR 41 SB Ramps				
• **SB Approach**	**F**	**123.6**	**C**	**22.8**
Bush Street at SR 41 NB Ramps				
• NB Approach	D	28.7	B	14.3
Bush Street at 19 ½ Avenue	C	23.4	B	12.5

[1]Delay per vehicle secs = seconds SR = State Route NB = northbound
SB = southbound

Table 3.4.17-3 shows the Existing (2018) Plus Project Phases 1, 2, and 3 levels of service for the study intersections. Intersections that are projected to operate below the adopted level of service standards are shown bolded.

Table 3.4.17-3
Existing (2018) Plus Project Phases 1, 2, & 3 Traffic Conditions Analysis
Intersection Weekday Peak Hour Level of Service

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay[1] (secs)	LOS	Delay[1] (secs)
Bush Street at College Drive				
• NB Approach	C	19.2	B	11.1
Bush Street at Semas Avenue				
• NB Approach	C	20.7	C	15.2
Bush Street at Belle Haven Drive	**F**	**110.0**	C	21.8
Bush Street at SR 41 SB Ramps				
• **SB Approach**	**F**	**285.0**	**E**	**37.6**
Bush Street at SR 41 NB Ramps				
• **NB Approach**	**F**	**109.0**	C	23.0
Bush Street at 19 ½ Avenue	D	32.1	B	13.8

[1]Delay per vehicle secs = seconds SR = State Route NB = northbound
SB = southbound

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard, meet the urban peak hour signal warrant, or exceed the available storage lengths in the 95th percentile condition, the following improvements are recommended in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario. The mitigated study intersections lane configurations and intersection control are the same in all three phase analyses of Existing (2018) Plus Project. The City and developer are in negotiations to determine the appropriate method of mitigation.

MITIGATION MEASURE(S)

MM TRA-1: Prior to completion of Phase 1, the project developer shall complete the following:

e. **Bush Street at SR 41 NB Ramps:**

- Signalize or install a temporary roundabout.
- Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections.

f. **Bush Street at Belle Haven Drive:**

- Signalize the intersection or install a temporary roundabout.
- Coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection. Lengthen the southbound left-turn pocket from 75 feet to 100 feet.
- Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane.
- Construct an eastbound 75 feet left-turn pocket.
- Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two through lanes and a separate right-turn lane.
- Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket.

g. **Bush Street at SR 41 SB Ramps:**

- Signalize the intersection or install a temporary roundabout.
- Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections.
- Lengthen the westbound left-turn pocket from 249 feet to 350 feet.

h. **Bush Street at 19 ½ Avenue:**
- Lengthen the northbound left-turn pocket from 48 feet to 175 feet.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated.***

Impact #3.4.17b – Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

Please see Impact #3.4.17a, above. With the mitigation measures listed in Impact #3.4.17a, the impacts would be mitigated.

MITIGATION MEASURE(S)

Implement MM TRA-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.17c – 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)?

The project will be designed to current standards and safety regulations. All intersections will be constructed as to comply with the City and Caltrans regulations, and design and safety standards of Chapter 33 of the California Building Codes (CBC) and the guidelines of Title 24 in order to create safe and accessible roadways.

Vehicles exiting the subdivision will be provided with a clear view of the roadway without obstructions. Landscaping associated with the entry driveways could impede such views, if improperly installed. Specific circulation patterns and roadway designs will incorporate all applicable safety measures to ensure that hazardous design features or inadequate emergency access to the site or other areas surrounding the project area would not occur.

Therefore, with the incorporated design features and all applicable rules and regulations, the project will have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.17d – Would the project result in inadequate emergency access?

See the discussion in Impact #3.4.9f

State and City Fire Codes establishes standards by which emergency access may be determined. The proposed project would have to provide adequate unobstructed space for fire trucks to turn around. The proposed project site would have adequate internal circulation capacity including entrance and exit routes to provide adequate unobstructed space for fire trucks and other emergency vehicles to gain access and to turn around.

The proposed project would not inhibit the ability of local roadways to continue to accommodate emergency response and evacuation activities. The proposed project would not interfere with the City's adopted emergency response plan.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.18 - Tribal Cultural Resources				
Would the project:				
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.	☐	☒	☐	☐

Discussion

Impact #3.4.18a(i) – 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 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)?

Please see Impacts #3.4.5a, #3.4.5b, and #3.4.5d, above.

On March 12, 2020 letters were mailed to chairman of the Santa Rosa Rancheria Tachi Yokut Tribe and proof of delivery was dated March 16, 2020. The letter included a brief project description and location maps. To date, no response has been received from any of the Indian tribes contacted.

On September 27, 2019, it was 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 October 2, 2019, with its findings and attached a list of Native American tribes and individuals culturally affiliated with the project area. On October 17, 2019, an outreach letter was mailed to each of the contacts identified by the NAHC (Appendix C). The outreach letter and follow-up calls are considered best practices within cultural resource management (Applied EarthWorks, Inc , 2019).

With implementation of Mitigation Measures MM CUL-1 through MM CUL-4, the project would not cause a substantial adverse change in the significance of a tribal cultural resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources.

MITIGATION MEASURE(S)

Implement MM CUL-1 through MM CUL-4.

LEVEL OF SIGNIFICANCE

Impact would be ***less than significant with mitigation incorporated***.

Impact #3.15.17a(ii) - 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 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?

Please see Impacts #3.4.5a, #3.4.5b, and #3.4.5d, above.

With implementation of Mitigation Measures MM CUL-1 through MM CUL-4, the project would not cause a substantial adverse change in the significance of a tribal cultural resource that is 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.

MITIGATION MEASURE(S)

Implement MM CUL-1 through MM CUL-4.

LEVEL OF SIGNIFICANCE

Impact would be ***less than significant with mitigation incorporated***.

3.4.19 - UTILITIES AND SERVICE SYSTEMS

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c. Result in a determination by the wastewater treatment provider that 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?	☐	☒	☐	☐
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?	☐	☐	☒	☐
e. Comply with federal, State, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

Discussion:

Impact #3.4.19a – Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The project would be constructed on land that has already been designated for residential development in the General Plan. The City has indicated that the infrastructure necessary to serve the project is available and sufficient and will connect to the City's existing water and sewer systems. The project is located within the planned future growth and service area for the City services.

Therefore, no additional sewer capacity would be required for the proposed project. Impacts are considered less than significant.

The City of Lemoore belongs to the San Joaquin Valley Power Authority, which was formed in November 2006, to develop and conduct electricity-related programs for the region. The San Joaquin Valley Power Authority is the governing body authorized by Community Choice, created by the California legislature in 2002, to provide an opportunity for local government (cities, counties or combinations of cities and counties) to purchase electricity on behalf of their residents and businesses. Community Choice is only for the purchase of electricity. The delivery, metering, billing, operation and maintenance of wires and poles remains the responsibility of PG&E within Lemoore (City of Lemoore , 2008).

There is existing trunk and transmission facilities adequate to meet present and projected demand in the community. The project will connect to the existing transmission lines for electrical power. Telecommunication requirements for the project are typical of this type of land use and would not require any expansion or construction of new telecommunication facilities.

The proposed project would not require or result in the construction or expansion of existing of new water, wastewater treatment, electrical or telecommunications facilities. Therefore, the project would have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.19b – Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

As noted in Impact #3.4.10b, the Tulare Lake Subbasin total storage capacity is estimated to be 17,100,000-acre feet to a depth of 300 feet, and 82,500,000-acre feet to the base of fresh groundwater. According to the 2015 Urban Water Management Plan, the City's 2015 maximum day demand is approximately 12.8 mgd. It is anticipated that the City has sufficient water available to supply the project.

The project will connect to the existing water supply system. The usage of water would be consistent with the City's current demands. As noted previously, the project will comply with City municipal codes related to water conservation, such as xeriscape landscaping, drip irrigation, low flow toilets, water efficient appliances, etc. The proposed increase in water usage at the project site is not anticipated to require the construction of new water facilities or the expansion of existing facilities. Impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.19c – Would the project result in a determination by the wastewater treatment provider that 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?

Municipal Code Chapter 4, Section 8-4-1 notes that the development of land for urban uses substantially accelerates the concentration of surface and storm waters. The City has established drainage fees to defray all or a part of the actual or the estimated cost of constructing planned drainage facilities for the removal of surface and storm waters from drainage areas. The project will be reviewed by the Department of Public Works and any applicable drainage fees will be determined. The payment of the fees would help reduce impacts of the project related to wastewater treatment.

Thus, average influent flow to serve development in accord with the General Plan is projected to drop to 3.1 mgd in 2015, and then rise to 6.3 mgd in 2030. The existing headworks will need to be upgraded between year 2015 and 2030 and treatment facilities must be expanded or replaced with discharge requirement-compliant facilities which can handle increased influent volumes.

The project will connect to the existing City sewer system. The generation of wastewater and water would be consistent with the City requirements. The proposed increase in water and wastewater usage at the project site is not anticipated to require the construction of new water or wastewater treatment facilities or the expansion of existing facilities. Impacts would be less than significant.

The project will connect to the existing storm drain lines. The site engineering and design plans for the proposed project would be required to implement BMPs, comply with requirements of the City Building and Development Standards and comply with the NPDES General Permit. Implementation of MM GEO-1 would reduce impacts to less than significant.

Therefore, the project would not require or result in the construction of new storm water drainage facilities or expansion of existing facilities.

MITIGATION MEASURE(S)

Implementation of MM GEO-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***

Impact #3.4.19d – 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?

Implementation of the proposed project would result in the generation of solid waste on the site, which would increase the demand for solid waste disposal. During construction these materials, which are not anticipated to contain hazardous materials, would be collected and transported away from the site to an appropriate disposal facility.

Solid waste disposal for Lemoore is managed by Kings Waste and Recycling Authority (KWRA). The City's PWD Refuse Division is responsible for solid waste collection services. The majority of the City's solid waste is taken to the Kettleman Hills non-hazardous landfill facility, owned by Chemical Waste Management (CWMI). The facility is located south of Lemoore and has an available capacity of 15.6 million cubic yards as of 2020 (Cal Recycle , 2020). KWRA is currently studying the future needs of solid waste services including building a new landfill to be operated by CWMI near the existing site. The County has a 25-year contract with CWMI to handle its solid waste until 2023 (City of Lemoore , 2008).

The project, in compliance with federal, State, and local statutes and regulations related to solid waste, would dispose of all waste generated onsite at an approved solid waste facility. The project does not, and would not conflict with federal, State, or local regulations related to solid waste. The proposed project would be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs in compliance with federal, State, and local statutes and regulations related to solid waste. Therefore, the project would have a less-than-significant impact.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.19e – Would the project comply with federal, State, and local management and reduction statutes and regulations related to solid waste?

The 1989 California Integrated Waste Management Act (AB 939) requires Kings County to attain specific waste diversion goals. In addition, the California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires expanded or new development projects to incorporate storage areas for recycling bins into the proposed project design. Reuse and recycling of construction debris would reduce operating expenses and save valuable landfill space.

The project is subject to the solid disposal ordinance of the City of Lemoore as well as the rules of the contracted waste franchise. The project is also subject to Title 4- Chapter 1 of the Lemoore Municipal Code that regulates all solid waste activities from disposal, sorting, and recycling of materials. The Lemoore Public Works- Refuse Department would provide refuse, recycling and green waste collection services. Refuse service fees have been established and would be charged by the City when services are requested.

The proposed project would not be expected to significantly impact Lemoore or Kings County landfills. The proposed project would be required to comply with all federal, State, and local statues and regulations related to solid waste. Therefore, implementation of the proposed project would result in a less-than-significant impact. The City's solid waste disposal program has capacity for, or are planned to maintain capacity for, community growth in accord with the adopted General Plan. As this project is in accordance with the General Plan, the impacts would be less than significant.

According to CalRecycle, the implementation of the local requirements has led to Kings County meeting their required diversion and disposal targets. Therefore, the implementation and compliance with the local regulations would lead to a less-than-significant impact for the project.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
3.4.20 - WILDFIRE				
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?	☐	☐	☒	☐
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?	☐	☐	☒	☐
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or	☐	☐	☒	☐
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?	☐	☐	☒	☐

Discussion:

Impact #3.4.20a – Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

See Impact #3.4.9f regarding emergency response.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.20b – 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?

Wildfire hazard data for the Lemoore Planning Area is provided by the California Department of Forestry and Fire Protection, as summarized in Table 3.4.20-1. The majority of the City is considered to have either little or no threat or a moderate threat of wildfire. Only one percent of the Planning Area currently has a high threat of wildfire. Wildfire hazard present in the Planning Area should decrease as vacant parcels become developed.

Table 3.4.20-1
Existing Wildfire Hazards

Fire Hazards	Acreage	Percent of City Area
Little or No Threat	5,648	46
Moderate	6,494	53
High	85	1
Very High	0	0
Total	**12,227**	**100**

There are no other factors of the project or the surrounding area that would exacerbate wildfire risks, and thereby expose project occupants to pollutant concentration from a wildfire or the uncontrolled spread of a wildfire. Therefore, impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.20c – Would the project, require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines?

See Impacts #3.4.20a and b, above.

The project would require the installation or maintenance of additional distribution lines to connect the residences to the existing utility grid. However, the project would be constructed in accordance with all local and State regulations regarding power lines and other related infrastructure, as well as fire suppression requirements.

Therefore, the project would not exacerbate fire risk or result in temporary or ongoing impacts to the environment and impacts would be less than significant.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

Impact #3.4.20d – 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?

The project site is not located near the ocean or a steep topographic feature (i.e., mountain, hill, bluff, etc.). Additionally, there is no body of water within the vicinity of the project site. As shown in Figure 3.4.9-1, the project is not located within a FEMA 100-year floodplain. According to FEMA, the site is located in an area of minimal flood hazard and has a less than 0.2 percent chance of an annual flooding. As such, the project would not place housing within a 100-year flood hazard area as mapped on a federal flood hazard boundary or flood insurance rate map or other flood hazard delineation map.

Therefore, the project will not expose people or structures to risks of flooding, landslides, runoff, slope instability, or drainage changes.

MITIGATION MEASURE(S)

No mitigation is required.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant***.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
### *3.4.21 - MANDATORY FINDINGS OF SIGNIFICANCE*				
a. Does the project have the potential to 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?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c. Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Discussion:

Impact #3.4.21a – Does the project have the potential to 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?

As evaluated in this IS/MND, the proposed project would not 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; reduce the number or restrict the range of an endangered, rare, or threatened species; or eliminate important examples of the major periods of California history or prehistory. Mitigation measures have been included to lessen the significance of potential impacts. Similar mitigation measures would be expected of other projects in the surrounding area, most of which share a similar cultural paleontological and biological resources. Consequently, the incremental effects of the proposed project, after mitigation, would not contribute to an adverse cumulative impact on these resources. Therefore, the project would have a less-than-significant impact with mitigation incorporated.

MITIGATION MEASURE(S)

Implement MM BIO-1 through MM BIO-6; MM CUL-1 thru MM CUL-4.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.21b - Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

As described in the impact analyses in Sections 3.4.1 through 3.4.20 of this IS/MND, any potentially significant impacts of the proposed project would be reduced to a less-than-significant level following incorporation of the mitigation measures. All planned projects in the vicinity of the proposed project would be subject to review in separate environmental documents and required to conform to the City of Lemoore General Plan, zoning, mitigate for project-specific impacts, and provide appropriate engineering to ensure the development meets are applicable federal, State and local regulations and codes. As currently designed, and with compliance of the recommended mitigation measures, the proposed project would not contribute to a cumulative impact. Thus, the cumulative impacts of past, present, and reasonably foreseeable future projects would be less than cumulatively considerable.

MITIGATION MEASURE(S)

Implement MM BIO-1 through MM BIO-6; MM CUL-1 thru MM CUL-4, MM GEO-1 thru MM GEO-2, and MM TRA-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

Impact #3.4.21c - Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?

All of the project's impacts, both direct and indirect, that are attributable to the project were identified and mitigated to a less-than-significant level. All planned projects in the vicinity of the proposed project would be subject to review in separate environmental documents and required to conform to State regulations, the City of Lemoore General Plan, zoning ordinance, and municipal codes to mitigate for project-specific impacts. The project will have the appropriate engineering to ensure the development meets are applicable federal, State and local regulations and codes. Thus, the cumulative impacts of past, present, and reasonably foreseeable future projects would be less than cumulatively considerable. Therefore, the proposed project would not either directly or indirectly cause substantial adverse effects on human beings because all potentially adverse direct impacts of the proposed project are identified as having no impact, less-than-significant impact, or less-than-significant impact with mitigation incorporated.

MITIGATION MEASURE(S)

Implement MM BIO-1 through MM BIO-6; MM CUL-1 thru MM CUL-4, MM GEO-1 thru MM GEO-2, and MM TRA-1.

LEVEL OF SIGNIFICANCE

Impacts would be ***less than significant with mitigation incorporated***.

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APPENDIX A

AIR QUALITY IMPACT ANALYSIS

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

FEB 27 2020

MAR 04 2020
BY:....................

Planning Department
City of Lemoore
711 W. Cinammon Drive
Lemoore, CA 93245

Re: Air Impact Assessment (AIA) Application Approval
ISR Project Number: C-20200078
Land Use Agency: City of Lemoore
Land Use Agency ID Number: VTM 848

To Whom It May Concern:

The San Joaquin Valley Air Pollution Control District (District) has approved the Air Impact Assessment (AIA) application for the Lennar Tract 848 project located at Pederson Street in Lemoore, California. Pursuant to District Rule 9510, Section 8.4, the District is providing the City of Lemoore with the following information:

- A notification of AIA approval (this letter)
- A statement of tentative rule compliance (this letter)
- A summary of project emissions and emission reductions
- A summary of the off-site fees
- A copy of the Air Impact Assessment application
- An approved Monitoring and Reporting Schedule

Certain emission mitigation measures proposed by the applicant may be subject to approval or enforcement by the City of Lemoore. No provision of District Rule 9510 requires action on the part of the City of Lemoore; however, please review the enclosed list of mitigation measures and notify the District if the proposed mitigation measures are inconsistent with your agency's requirements for this project. The District can provide the detailed emissions analysis upon request.

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

www.valleyair.org www.healthyairliving.com

Printed on recycled paper.

If you have any questions, please contact Ms. Sharla Yang at (559) 230-5934.

Sincerely,

Arnaud Marjollet
Director of Permit Services

for: Robert Gilles
Program Manager

AM: sy

Enclosures

Emissions Estimator Worksheet

Applicant/Business Name:	Lennar Central Valley
Project Name:	Lennar Tract 848
Project Location:	Lemoore, CA
District Project ID No.:	20200078

Project Construction Emissions

If applicant selected Construction Clean Fleet Mitigation Measure - Please select "Yes" from dropdown menu: Yes ▼

			NOx					PM10				
Project Phase Name	ISR Phase	Construction Start Date	Unmitigated Baseline(1) (TPY)	Mitigated Baseline(2) (TPY)	Achieved On-site Reductions(3) (tons)	Required Off-site Reductions(4) (tons)	Emission Reductions Required by Rule(5)	Unmitigated Baseline(1) (TPY)	Mitigated Baseline(2) (TPY)	Achieved On-site Reductions(3) (tons)	Required Off-site Reductions(4) (tons)	Emission Reductions Required by Rule(5)
Construction: Phase 1: 152 DU	1	11/01/2020	0.7254	0.5803	0.1451	0.0000	0.1451	0.0350	0.0192	0.0158	0.0000	0.0158
Construction: Phase 1: 152 DU cont.	2	01/01/2021	2.3181	1.8544	0.4637	0.0000	0.4636	0.1190	0.0654	0.0536	0.0000	0.0536
	3				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
Construction: Phase 1: 152 DU cont.	4	01/01/2022	0.5853	0.4682	0.1171	0.0000	0.1171	0.0307	0.0168	0.0139	0.0000	0.0138
Construction: Phase 2: 107 DU	5	03/01/2022	2.4004	1.9203	0.4801	0.0000	0.4801	0.1254	0.0689	0.0565	0.0000	0.0564
	6				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
Construction: Phase 2: 107 DU cont.	7	01/01/2023	0.2929	0.2343	0.0586	0.0000	0.0586	0.0151	0.0083	0.0068	0.0000	0.0068
Construction: Phase 3: 103 DU	8	02/01/2023	2.9405	2.3524	0.5881	0.0000	0.5881	0.1403	0.0771	0.0632	0.0000	0.0631
	9				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
Construction: Phase 3: 103 DU cont.	10	01/01/2024	0.0217	0.0173	0.0044	0.0000	0.0043	0.0010	0.0005	0.0005	0.0000	0.0005
		Total	9.2843	7.4272	1.8571	0.0000	1.8569	0.4665	0.2562	0.2103	0.0000	0.2099

Total Achieved On-Site Reductions (tons)		
ISR Phase	NOx	PM10
1	0.1451	0.0158
2	0.4637	0.0536
3	2.5703	9.5180
4	0.1171	0.0139
5	0.4801	0.0565
6	1.5713	4.0690
7	0.0586	0.0068
8	0.5881	0.0632
9	1.5398	5.2480
10	0.0044	0.0005
Total	7.5385	19.0453

Project Operations Emissions (Area + Mobile)

			NOx						PM10					
Project Phase Name	ISR Phase	Operation Start Date	Unmitigated Baseline(1) (TPY)	Mitigated Baseline(2) (TPY)	Achieved On-site Reductions(3) (tons)	Required Off-site Reductions(4) (tons)	Total Emission Reductions Required by Rule(6)	Average Annual Emission Reductions Required by Rule(7)	Unmitigated Baseline(1) (TPY)	Mitigated Baseline(2) (TPY)	Achieved On-site Reductions(3) (tons)	Required Off-site Reductions(4) (tons)	Total Emission Reductions Required by Rule(6)	Average Annual Emission Reductions Required by Rule(7)
	1				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	2				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Operation: Phase 1: 152 DU	3	06/01/2021	2.2058	1.8631	2.5703	2.9443	5.5145	0.5515	2.4184	1.4666	9.5180	2.5740	12.0920	1.2092
	4				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	5				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Operation: Phase 2: 107 DU	6	06/01/2022	1.4247	1.2152	1.5713	1.9905	3.5618	0.3562	1.4382	1.0313	4.0690	3.1220	7.1910	0.7191
	7				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	8				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Operation: Phase 3: 103 DU	9	06/01/2023	1.1901	0.9848	1.5398	1.4355	2.9753	0.2975	1.5156	0.9908	5.2480	2.3300	7.5780	0.7578
	10				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
		Total	4.8206	4.0631	5.6814	6.3703	12.0515	1.2052	5.3722	3.4887	18.8350	8.0260	26.8610	2.6861

Total Required Off-Site Reductions (tons)		
ISR Phase	NOx	PM10
1	0.0000	0.0000
2	0.0000	0.0000
3	2.9443	2.5740
4	0.0000	0.0000
5	0.0000	0.0000
6	1.9905	3.1220
7	0.0000	0.0000
8	0.0000	0.0000
9	1.4355	2.3300
10	0.0000	0.0000
Total	6.3703	8.0260

Notes:

TPY: Tons Per Year

(1) **Unmitigated Baseline:** The project's baseline emissions generated with no on-site emission reduction measures.

(2) **Mitigated Baseline:** The project's baseline emissions generated after on-site emisison reduction measures have been applied.

(3) **Achieved On-site Reductions:** The project's emission reductions achieved after on-site emission reduction measures have been applied.

(4) **Required Off-site Reductions:** The project's remaining emission reductions required by Rule 9510 if on-site emission reduction measures did not achieive the required rule reductions.

(5) **Emission Reductions Required by Rule:** The project's emission reductions required (20% NOx and 45% PM10) for construction from the unmitigated baseline.

(6) **Total Emission Reductions Required by Rule:** The project's emission reductions required (33.3% NOx and 50% PM10) for operations from the unmitigated baseline over a 10-year period.

(7) **Average Annual Emission Reductions Required by Rule:** The project's total emission reduction for operations required by Rule 9510 divided by 10 years.

Fee Estimator Worksheet

Applicant/Business Name:	Lennar Central Valley
Project Name:	Lennar Tract 848
Project Location:	Lemoore, CA
District Project ID No.:	20200078

NOTES:

(1) The start date for each ISR phase is shown in TABLE 1.

(2) If you have chosen a **ONE-TIME** payment for the project, then the total amount due for ALL PHASES is shown under TABLE 2.

(3) If you have chosen a **DEFERRED** payment schedule or would like to propose a **DEFERRED** payment schedule for the project, the total amount due for a specific year is shown in TABLE 3 according to the schedule in TABLE 1.

* If you have not provided a proposed payment date, the District sets a default invoice date of 60 days prior to start of the ISR phase.

If applicant selected Fee Deferral Schedule - Please select "Yes" from dropdown menu	Yes ▾

TABLE 1 - PROJECT INFORMATION

Project Phase Name	ISR Phase	Start Date per Phase	Scheduled Payment Date*
Construction: Phase 1: 152 DU	1	11/1/20	Clean Fleet
Construction: Phase 1: 152 DU cont.	2	1/1/21	Clean Fleet
Operation: Phase 1: 152 DU	3	6/1/21	05/31/2021
Construction: Phase 1: 152 DU cont.	4	1/1/22	Clean Fleet
Construction: Phase 2: 107 DU	5	3/1/22	Clean Fleet
Operation: Phase 2: 107 DU	6	6/1/22	05/31/2022
Construction: Phase 2: 107 DU cont.	7	1/1/23	Clean Fleet
Construction: Phase 3: 103 DU	8	2/1/23	Clean Fleet
Operation: Phase 3: 103 DU	9	6/1/23	05/31/2023
Construction: Phase 3: 103 DU cont.	10	1/1/24	Clean Fleet
TOTAL (tons)			

TABLE 2 - No Fee Deferral Schedule (FDS) / TABLE 2 - NO FDS

Pollutant	Required Offsite Reductions (tons)	2020
NOx	0.0000	0.0000
PM10	0.0000	0.0000
NOx	0.0000	0.0000
PM10	0.0000	0.0000
NOx	2.9443	2.9443
PM10	2.5740	2.5740
NOx	0.0000	0.0000
PM10	0.0000	0.0000
NOx	0.0000	0.0000
PM10	0.0000	0.0000
NOx	1.9905	1.9905
PM10	3.1220	3.1220
NOx	0.0000	0.0000
PM10	0.0000	0.0000
NOx	0.0000	0.0000
PM10	0.0000	0.0000
NOx	1.4355	1.4355
PM10	2.3300	2.3300
NOx	0.0000	0.0000
PM10	0.0000	0.0000
NOx	6.3703	6.3703
PM10	8.0260	8.0260

Offsite Fee by Pollutant ($)	NOx	$59,561
	PM10	$72,321
Administrative Fee ($)		$5,275.28
Offsite Fee ($)		$131,882.00
Total Project Offsite Fee ($)		$137,157.28

Rule 9510 Fee Schedule ($/ton)		
Year	Nox	PM10
2020 and Beyond	$9,350	$9,011

TABLE 3 - APPROVED FEE DEFERRAL SCHEDULE (FDS) BY PAYMENT YEAR

2020	2021	2022	2023	2024	2025	2026	2027	2028
	2.9443							
	2.5740							
		1.9905						
		3.1220						
			1.4355					
			2.3300					
0.0000	2.9443	1.9905	1.4355	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	2.5740	3.1220	2.3300	0.0000	0.0000	0.0000	0.0000	0.0000
$0	$27,529	$18,611	$13,421	$0	$0	$0	$0	$0
$0	$23,194	$28,132	$20,995	$0	$0	$0	$0	$0
$0.00	$2,028.92	$1,869.72	$1,376.64	$0.00	$0.00	$0.00	$0.00	$0.00
$0.00	$52,751.92	$48,612.72	$35,792.64	$0.00	$0.00	$0.00	$0.00	$0.00
			$137,157.28					

San Joaquin Valley Air Pollution Control District

Indirect Source Review (ISR) - Air Impact Assessment (AIA) Residential/Non-Residential/Mixed-Use Application Form

A. Applicant Information

Applicant/Business Name: **Lennar Central Valley**

Mailing Address: **8080 N. Palm, Suite 110** | City: **Fresno** | State: **CA** | Zip: **93711**

Contact: **Jeff Callaway** | Title: **Project Manager**

Is the Applicant a licensed state contractor? ☒ No ☐ Yes, please provide State License number:

Phone: **559.231.1237** | Fax: **559.447.3404** | Email: **Jeff.Callaway@lennar.com**

B. Agent Information (if applicable):

If an Agent is signing the Air Impact Assessment Application on behalf of the Applicant, a signed letter from the Applicant giving the Agent authorization is required.

Agent/Business Name: **Mitchell Air Quality Consulting**

Mailing Address: **1164 E. Decatur Ave.** | City: **Fresno** | State: **CA** | Zip: **93720**

Contact: **David M. Mitchell** | Title: **Owner/Senior Air Quality Scientist**

Phone: **559.246.3732** | Fax: | Email: **dmitchell@mitchellaq.com**

C. Project Information

Project Name: **Lennar Tract 848** | Tract Number(s) (if known): **848**

Project Location | Street: **Pederson Street** | City: **Lemoore** | Zip: **93245**

Cross Streets: **NW corner Pederson Street and Semas Avenue** | County: **Kings**

Permitting Agency: **City of Lemoore** | Planner: **Steve Brandt, City Planner**

Mailing Address: **711 W. Cinammon Drive** | City: **Lemoore** | State: **CA** | Zip: **93245**

Permit Type and Number (if known): **VTM 848**

Subject to Project-Level Discretionary Approval? ☒ Yes ☐ No

Last Project-Level Discretionary Approval Date: **TBD**

Last Project-Level Ministerial Approval Date: _____

D. Project Description

Please briefly describe the project (e.g.: 300 multi family residential units apartments and 35,000 square feet of commercial uses): **362 unit residential subdivision on 54.0 acres in 3 phases.**

Please check the box next to each applicable land use below:

☐ Commercial / Retail	☐ Educational	☐ Office	☐ Warehouse
☒ Residential	☐ Government	☐ Industrial	☐ Distribution Center
☐ Recreational (e.g. park)	☐ Medical	☐ Manufacturing	☐ Other: _____

Select land use setting below:

☒ Urban ☐ Rural

E. Notice of Violation

Is this application being submitted as a result of receiving a Notice of Violation (NOV) from the District?

☒ No ☐ Yes, NOV # _____

F. Voluntary Emission Reduction Agreement

Is this project part of a larger project for which there is a Voluntary Emission Reduction Agreement (VERA) with the District?

☒ No ☐ Yes, VERA # _____

G. Optional Section

Do you want to receive information about the Healthy Air Living Business Partners Program? ☐ Yes ☒ No

FOR APCD USE ONLY

Filing Fee Received: #562.00 Date Paid: Applicant #: C3028668	eck #: 1236 Project #: C20200078	**Date Stamp** ıance	**Date Stamp: Permit** JAN 30 2020 Permits Services

H. Parcel and Land Owner Information

	APN (000-000-00 Format)	Gross Acres	Land Owner
1.	**023-40-031**	**20.90**	**Patrick V. Ricchiuti Family Trust**
2.	**023-510-040**	**55.62**	**Patrick V. Ricchiuti Family Trust**
3.			
4.			

Additional sheets for listing APN numbers can be found on the District's website at www.valleyair.org.

I. Project Development and Operation

Will the project require demolition of existing structures?	☐ Yes, *complete I-1*	☒ No, *complete I-2*

I-1. Demolition

Total square feet of building(s) footprint to be demolished:	Number of Building Stories:
Demolition Start Date (Month/Year):	Number of Days for Demolition:

I-2. Timing

Expected number of work days per week during construction? ☒ 5 days ☐ 6 days ☐ 7 days	Will the project be developed in multiple phases? ☒ Yes, *complete I-3* ☐ No, *complete I-4*

I-3. Phased Site Development and Building Construction

In addition to the information below the applicant may submit a phase specific activity timeline. The phase specific activity timeline form can be found on the District's website at www.valleyair.org.

1	Start of Construction (Month/Year): **11/2020**	Gross Acres: **27.62**
	End of Construction (Month/Year): **5/2022**	Net Acres (area devoted to buildings/structures): **6.28**
	First Date of Occupation (Month/Year): **6/2021**	Paved Parking Area (# of Spaces): **NA**
	Building Square Footage: **273,600**	Number of Dwelling Units: **152**
2	Start of Construction (Month/Year): **3/2022**	Gross Acres: **11.03**
	End of Construction (Month/Year): **3/2023**	Net Acres (area devoted to buildings/structures): **4.42**
	First Date of Occupation (Month/Year): **6/2022**	Paved Parking Area (# of Spaces): **NA**
	Building Square Footage: **192,600**	Number of Dwelling Units: **107**
3	Start of Construction (Month/Year): **2/2023**	Gross Acres: **15.49**
	End of Construction (Month/Year): **1/2024**	Net Acres (area devoted to buildings/structures): **4.21**
	First Date of Occupation (Month/Year): **6/2023**	Paved Parking Area (# of Spaces): **NA**
	Building Square Footage: **185,400**	Number of Dwelling Units: **103**
4	Start of Construction (Month/Year):	Gross Acres:
	End of Construction (Month/Year):	Net Acres (area devoted to buildings/structures):
	First Date of Occupation (Month/Year):	Paved Parking Area (# of Spaces):
	Building Square Footage:	Number of Dwelling Units:

Additional sheets for phasing information can be found on the District's website at www.valleyair.org.

I-4. Single Phase Development

Start of Construction (Month/Year):	Gross Acres:
End of Construction (Month/Year):	Net Acres (area devoted to buildings/structures):
First Date of Occupation (Month/Year):	Paved Parking Area (# of Spaces):
Building Square Footage:	Number of Dwelling Units:

J. On-Site Air Pollution Reductions (Mitigation Measures)

Listed below are categories of possible mitigation measures that will reduce a project's impact on air quality. If a category is applicable to the project, check "Yes", and please complete the corresponding page to identify specific mitigation measures within that category. If a category is not applicable to the project, check "No".

1. Construction Clean Fleet (making a commitment to using a construction fleet that will achieve the emission reductions required by District Rule 9510)

☒ Yes, *please complete mitigation measure 1*

☐ No

2. Land Use/Location (e.g. increased density, improve walkability design, increase transit, etc.)

☒ Yes, *please complete applicable mitigation measures 2a through 2f*

☐ No

3. Neighborhood/Site Enhancements (e.g. improve pedestrial network, traffic calming measures, NEV network, etc.)

☒ Yes, *please complete applicable mitigation measures 3a through 3c*

☐ No

4. Parking Policy/Pricing (e.g. parking cost, on-street market pricing, limit parking supply, etc.)

☐ Yes, *please complete applicable mitigation measure 4a through 4e*

☒ No

5. Commute Trip Reduction Programs (e.g. workplace parking charge, employee vanpool/shuttle, ride sharing program, etc.)

☐ Yes, *please complete applicable mitigation measures 5a through 5f*

☒ No

6. Building Design (e.g. woodstoves or fireplaces)

☒ Yes, *please complete mitigation measure 6*

☐ No

7. Building Energy (e.g. exceed title 24, electrical maintenance equipment)

☐ Yes, *please complete applicable mitigation measures 7a through 7b*

☒ No

8. Solar Panels (e.g. incorporate solar panels in the project)

☒ Yes, *please complete applicable mitigation measure 8*

☐ No

9. Electric Vehicle (EV) Charger (e.g. incorporate EV charger(s) in the project)

☐ Yes, *please complete applicable mitigation measure 9*

☒ No

K. Review Period

You may request a five (5) day period to review a draft of the District's analysis of your project before it is finalized. However, if you choose this option, it will delay the project's finalization by five (5) business days.

☒ **I request to review a draft of the District's analysis.**

L. Fee Deferral Schedule

If the project's on-site air pollution reductions (mitigation measure) insufficiently reduced air pollution as outlined in Rule 9510, an off-site fee is assessed based on the excess air pollution. The money collected from this fee will be used by the District to reduce air pollution emissions 'off-site' on behalf of the project.

An Applicant may request a deferral of all or part of the 'off-site' fees up to, but not to exceed, the start date of construction. The start of construction is any of the following, whichever occurs first: start of grading, start of demolition, or any other site development activities not mentioned above.

☒ **I request a Fee Deferral Schedule, and have enclosed the Fee Deferral Schedule Application.**

The Fee Deferral Schedule Application, can be found on the District's website at www.valleyair.org.

M. Change of Project Developer

The Applicant assumes all responsibility for ISR compliance for this project. If the project developer changes, the Applicant must notify the Buyer, and both Buyer and Applicant must file a 'Change of Project Developer' form with the District. If there is a change of project developer, and a 'Change of Project Developer' form is not filed with the District, the Applicant will remain liable for ISR compliance.

The Change of Project Developer form can be found on the District's website at www.valleyair.org.

N. Attachments

Required:	***If applicable:***
☒ Tract Map or Project Design Map	☒ Letter from Applicant granting Agent authorization
☒ Vicinity Map	☒ Fee Deferral Schedule Application
☒ Application Filing Fee $841.00 for mixed use and non-residential projects **OR** $562.00 for residential projects only	☐ Monitoring & Reporting Schedule ☒ Supporting documentation for selected Mitigation Measures

O. Certification Statement

I certify that I have reviewed and completed the entire application and hereby attest that the information relayed within is true and correct to the best of my knowledge. I commit to implementation of those on-site mitigation measures that I have selected above. I am responsible for notifying the District if I will be unable to implement these mitigation measures. If a committed mitigation measure is not implemented, the project may be re-assessed for air quality impacts.

(An authorized Agent may sign the form in lieu of the Applicant if an authorization letter **signed by the Applicant** is provided).

Name (printed): David M. Mitchell	Title: Owner/Senior Air Quality Scientist
Signature: David M. Mitchell	Date: 1/29/2020

Mitigation Measure 1: Construction Clean Fleet

Will the project use a construction fleet to achieve the emission reductions required by District Rule 9510? *(Note: by checking "yes" the Applicant could potentially reduce any construction related off-site fees to zero.)* ☐ No ☒ Yes*

***If yes**, daily records of the total hours of operation for each piece of equipment greater than 50-horsepower being used on the project site during construction must be maintained. Within 30-days of completing construction of each project phase, a report summarizing total hours of operation by equipment type, equipment model year and horsepower for each piece of construction equipment greater than 50-horsepower must be submitted to the District. To assist in this recordkeeping, The *Detailed Fleet Template* is available on the District's website at http://www.valleyair.org/ISR/ISRFormsAndApplications.htm.

For each project phase, the District will verify that the fleet details achieved the required emission reductions.

Mitigation Measure 2a: Increase Density

Will the Project be located within 1/2 mile radius of increased density? Density is measured in terms of dwelling units or jobs per acre. A project located in areas of increased density may reduce emissions associated with traffic.

*Note: There are approximately 502.4 acres in a 1/2 mile radius.

☒ No

☐ Yes, *please complete sections below:*

1. Number of Dwelling Units within 1/2 radius of Project:		
2. Number of Jobs within 1/2 mile radius of Project:		
3. Density: Density is the 'Number of Dwelling Units' or 'Number of Jobs' within ½ mile radius divided by 502.4 acres.	**Dwelling Units per Acre:**	
	Jobs per Acre:	

- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Documentation: Please attach supporting documentation (e.g.: map) to justify the provided jobs and housing. ☐ Attached

Mitigation Measure 2b: Increase Diversity

This mitigation measure applies to a project in an *Urban Area only.* Will the project be predominantly characterized by properties on which various uses, such as office, commercial, institutional, and residential are present within ¼ mile? Mixed-use development should encourage walking and other non-auto modes of transport and minimize need for external trips.

☒ No

☐ Yes, *please complete sections below:*

- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Documentation: Please attach supporting documentation (e.g.: map) to justify the project is characterized by various uses, such as office, commercial, institutional, and residential are within ¼ mile that encourage walking and non-auto modes of transport. ☐ Attached

Mitigation Measure 2c: Improve Walkability Design

1. Square Miles within the Study Area: **a.** If the distance from the center of the project out to its farthest boundary is less than or equal to ½ mile then the Square Miles within the Study Area will be 0.79. Enter this value in the blank to the right. **b.** If the distance from the center of the project out to its farthest boundary is greater than ½ mile then calculate the area value by: Study Area Square Miles = 3.14 x radius$^{(squared)}$. (Enter this value in the blank to the right.)	Square Miles

2. Intersection within the Study Area: Number and type of intersections within the project area:	Number of 3-Way Intersections:	25	x 3 =	75
	Number of 4-Way Intersections:	7	x 4 =	28
	Number of 5-Way Intersections:		x 5 =	
	Total Intersections (sum of above) =**103**			

3. Intersection Density within the Study Area: Intersection Density is the Study Area's 'Total Intersections' value (B.) divided by the 'Square Miles' value (A.):	**130.38** Intersections / sq. mi.

- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?

  ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*

  ☒ Yes, Name of enforcing agency: City of Lemoore

  Source of Requirement: Planned and existing development

Documentation: Please attach supporting documentation (e.g.: map) to justify number of intersections within ½ mile of the project. ☒ Attached

Mitigation Measure 2d: Improve Destination Accessibility

Will the project be located within 12 miles from downtown or a job center? The location of the project may increase the potential for pedestrians to walk and bike to these destinations and therefore reduce VMT.

☐ No

☒ Yes, *please complete sections below:*

- Distance to Downtown/Job Center (miles): **2.0**
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?

  ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*

  ☒ Yes, Name of enforcing agency: City of Lemoore

  Source of Requirement: Existing development

Documentation: Please attach supporting documentation (e.g: map) to justify the distance of the project to the Downtown/Job Center. ☒ Attached

Mitigation Measure 2e: Increase Transit Accessibility

Will the project be located near a transit station/stop at least within ¼ mile or near a rail at least within ½ mile that will facilitate the use of transit by people traveling to or from the project site?

☒ No

☐ Yes, *please complete sections below:*

- Distance to Rail Station (miles): ☐ ½ mile or less ☐ between ½ mile and 3 miles
- Distance to Transit Station (miles): ☐ ¼ mile
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?

  ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*

  ☐ Yes, Name of enforcing agency:

  Source of Requirement:

Documentation: Please attach supporting documentation (e.g.: map) to justify the project is located within ¼ mile of a transit station or within ½ mile of a rail from the project site. ☐ Attached

Mitigation measure 2f: Integrate Below Market Rate Housing

Is all or a portion of the residential units designated as deed-restricted below-market-rate (BMR) housing?

☒ No

☐ Yes, *please complete sections below:*

- Percentage of total dwelling units deed-restricted below market rate: _____%
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?

  ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*

  ☐ Yes, Name of enforcing agency: _____

  Source of Requirement: _____

Documentation: Please attach supporting documentation to justify all or a portion of the residential units that are designated as deed-restricted below-market-rate housing. ☐ Attached

Mitigation Measure 3a: Improve Pedestrian Network

Will the project provide a pedestrian access network that internally links all uses and connects to all existing or planned external streets and pedestrian facilities contiguous with the project site?

☐ No

☒ Yes, *please complete sections below:*

- Select one of the following areas, where pedestrian accommodations will be provided:

  ☐ within Project Site ☒ within Project Site and Connecting Off-Site ☐ Project Site is within a Rural setting
- Will this measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?

  ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*

  ☒ Yes, Name of enforcing agency: City of Lemoore

  Source of Requirement: City Development Standards

Mitigation Measure 3b: Provide Traffic Calming Measures

Will this project provide traffic calming measures which encourage people to walk or bike instead of using a vehicle (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, and others)?

☒ No

☐ Yes, p*lease complete sections below:*

- % Streets with Improvement within ½ mile of project site: ☐ 25% ☐ 50% ☐ 75% ☐ 100%
- % Intersections with Improvement within ½ mile of project site: ☐ 25% ☐ 50% ☐ 75% ☐ 100%
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 3c: Implement Neighborhood Electric Vehicle (NEV) Network

Will the project provide a NEV network including the necessary infrastructure such as parking, charging facilities, striping, signage, and educational tools?

*Note: NEVs are classified in the California Vehicle Code as a "low speed vehicle".

☒ No

☐ Yes, p*lease complete sections below:*

- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 4a: Limit Parking Supply

Will the project provide fewer parking spaces than the rate provided by the Institute of Transportation and Engineering (ITE) Parking Generation Handbook?

☒ No

☐ Yes, p*lease complete sections below:*

- % Reduction in Spaces: _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 4b: Unbundle Parking Cost

Will the project implement a monthly/annual parking charge?

☒ No

☐ Yes, p*lease complete sections below:*

- Monthly Parking Cost for Project Site ($):_____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No (*note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 4c: On- eet Market Pricing

Will this project and the city (in which the project is located) implement a pricing strategy which will increase the on-street public parking (e.g.: meter parking) by at least 25%?

☒ No

☐ Yes, *please complete sections below:*

- % Increase in Price: ☐ 25% ☐ 30% ☐ 40% ☐ 50%
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 4d: Transit Subsidy

Will the project provide subsidized/discounted daily or monthly public transit passes?

☒ No

☐ Yes, *please complete sections below:*

- % of employees to receive public transit passes: _____
- Please select the closest expected Daily Transit Subsidy Amount ($): ☐ $0.75 ☐ $1.50 ☐ $3 ☐ $6
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 4e: Implement Employee Parking "Cash-Out"

Will the project require employers to offer employee parking "cash-out"? The term "cash-out" is used to describe the employer providing employees with a choice of forgoing their current subsidized/free parking for a cash payment.

☒ No

☐ Yes, *please complete sections below:*

- % of employees to receive "cash-out": _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 5a: Workplace Parking Charge

Will the project implement workplace parking pricing at its employment centers (e.g., explicitly charging for parking for its employees, not providing employee parking and transportation allowances, educating employees about available alternatives)?

☒ No

☐ Yes, *please complete sections below:*

- % of employees paying for parking: _____
- Please select the closest expected Daily Cash out Amount ($): ☐ $1 ☐ $2 ☐ $3 ☐ $6
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 5b: Imp. ient School Bus Program

Will the project work with the school district to restore or expand school bus services in the project area and local community?

☒ No

☐ Yes, *please complete sections below:*

- % of families expected to using school bus program (those currently attending the school district): _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 5c: Encourage Telecommuting and Alternative Work Schedules

Will the project include the use of telecommuting or alternative work schedules to reduce the number of commute trips by employees?

☒ No

☐ Yes, *please complete sections below:*

- Percent of employees to participate in a 9/80 work schedule: ☐ 1% ☐ 3% ☐ 5% ☐ 10% ☐ 25%
- Percent of employees to participate in a 4/40 work schedule: ☐ 1% ☐ 3% ☐ 5% ☐ 10% ☐ 25%
- Percent of employees to participate in telecommuting 1.5 days: ☐ 1% ☐ 3% ☐ 5% ☐ 10% ☐ 25%
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 5d: Market Commute Trip Reduction Option

Will the project implement marketing strategies to reduce commute trips (e.g., new employee orientation of trip reduction and alternative mode option, event promotions, publications)? This measure should promote and educate employees on alternative transportation options.

☒ No

☐ Yes, *please complete sections below:*

- % of Employees Eligible: _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 5e: Employee Vanpool/Shuttle

Will this project implement an employer-sponsored vanpool or shuttle? Employer-sponsored vanpool programs entail an employer purchasing or leasing vans for employee use, and often subsidizing the cost of at lease program administration, if not more. Rider charges are normally set on the basis of vehicle and operating cost.

☒ No

☐ Yes, *please complete sections below:*

- % of employees participating in the vanpool program: _____
- % of vehicles for vanpooling: _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 5f: Prov e Ride Sharing Program

Will the project include a ride-sharing program?

☒ No

☐ Yes, *please complete sections below:*

- % of Employees participating in the ride-sharing program: _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Mitigation Measure 6: Hearth

Will the project include any woodstoves or fireplaces?

☐ No

☒ Yes, *please complete sections below:*

- ☒ Only natural gas hearth
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☒ Yes, Name of enforcing agency: City of Lemoore
    Source of Requirement: Building Plans

Mitigation Measure 7a: Exceed Title 24

Will the energy efficiency rating of the project's building(s) be greater than California Title 24 requirements?

☒ No

☐ Yes, *please complete sections below:*

- Percent of increase greater than California Title 24 requirements: _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Documentation: Please attach relevant analysis or summary pages of Title 24 documentation ☐ Attached

Mitigation Measure 7b: Landscape Equipment

Will the project provide electrical outlets on the front and rear of all residences, **and /or** provide the use of electrical maintenance equipment including but not limited to electric lawn mowers, electric leaf blowers, etc.? *(note 3% is the assumed statewide average for landscape equipment)*

☒ No

☐ Yes, *please complete sections below:*

- Percent of electric lawnmower that will be electrically powered:
- Percent of leaf blower that will be electrically powered:
- Percent of electric chainsaw that will be electrically powered:3
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☐ Yes, Name of enforcing agency: _____
    Source of Requirement: _____

Documentation: Please attach supporting documentation if claiming greater than 3%. ☐ Attached

Mitigation Measure 8: Solar Panels

Will the project include the installation of solar panels?

☐ No

☒ Yes, *please complete sections below:*

- Total power output of solar panels to be installed: **1,448** kW *(e.g.: 200 homes x 3kW=**600kW**.)*
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No *(note: if checked "no" this mitigation measure will require District enforcement)*
  - ☒ Yes, Name of enforcing agency: City of Lemoore
    Source of Requirement: Building Plans

Mitigation Measure 9: Electric Vehicle (EV) Charger

Will the project include the installation of electric vehicle (EV) charger(s)?

☒ No

☐ Yes, please complete sections below:

- Number of charging outlet(s) to be installed *(Note: a charger may have one or more charging outlets)*: _____
- Charging level (e.g.: Level 1, Level 2, or DC Fast Charge): _____
- Will this mitigation measure be required as a condition of approval by the land use agency, by other county or municipal codes, or other?
  - ☐ No (note: if checked "no" this mitigation measure will require District enforcement)
  - ☐ Yes, Name of enforcing agency: _____

  Source of Requirement: _____

SJVUAPCD

Indirect Source Review
Complete Project Summary Sheet &
Monitoring and Reporting Schedule

2/26/20
11:03 am

Project Name:	**LENNAR TRACT 848**
Applicant Name:	**LENNAR CENTRAL VALLEY**
Project Location:	**PEDERSON STREET** **NW CORNER PEDERSON STREET AND SEMAS AVENUE** **APN(s): 023-40-031, 023-510-040**
Project Description:	**LAND USE:** **Residential - 152 Dwelling Unit - Single Family Housing** **Residential - 152 Dwelling Unit - Single Family Housing** **Residential - 152 Dwelling Unit - Single Family Housing** **Residential - 152 Dwelling Unit - Single Family Housing** **Residential - 107 Dwelling Unit - Single Family Housing** **Residential - 107 Dwelling Unit - Single Family Housing** **Residential - 107 Dwelling Unit - Single Family Housing** **Residential - 103 Dwelling Unit - Single Family Housing** **Residential - 103 Dwelling Unit - Single Family Housing** **Residential - 103 Dwelling Unit - Single Family Housing** **ACREAGE: 76.52**
ISR Project ID Number:	**C-20200078**
Applicant ID Number:	**C-302868**
Permitting Public Agency:	**CITY OF LEMOORE**
Public Agency Permit No.	**VTM 848**

Existing Emission Reduction Measures

Enforcing Agency	Measure	Quantification	Notes

There are no Existing Measures for this project.

Non-District Enforced Emission Reduction Measures

Enforcing Agency	Measure	Specific Implementation	Source Of Requirements
CITY OF LEMOORE	Improve Walkability Design	130 Nodes/square mile	Planned and existing development
CITY OF LEMOORE	Improve Destination Accessibility	2 miles (distance to downtown or job center)	Existing development
CITY OF LEMOORE	Improve Pedestrial Network	Within Project Site and Connecting Off-Site	City development standards
CITY OF LEMOORE	Hearth	only natural gas hearth	Building plans
CITY OF LEMOORE	Install Solar Panel	Install solar panels with a total power output of 1,448 kW	Building plans

Number of Non-District Enforced Measures: 5

District Enforced Emission Reduction Measures

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review

Indirect Source Review
Complete Project Summary Sheet & Monitoring and Reporting Schedule

(District Enforced Emission Reduction Measures Continued)

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review
SJVAPCD	Construction Clean Fleet	For each project phase, maintain records of total hours of operation for all construction equipment, greater than 50 horsepower, operated on site. Within 30-days of completing construction of each project phase, submit to the District a summary report of total hours of operation, by equipment type, equipment model year and horsepower.	(Compliance Dept. Review)	Within 30-days of completing construction for each phase
SJVAPCD	Construction and Operation - Recordkeeping	For each project phase, all records shall be maintained on site during construction and for a period of ten years following either the end of construction or the issuance of the first certificate of occupancy, whichever is later. Records shall be made available for District inspection upon request.	(Compliance Dept. Review)	Ongoing
SJVAPCD	Construction and Operational Dates	For each project phase, maintain records of (1) the construction start and end dates and (2) the date of issuance of the first certificate of occupancy, if applicable.	(Compliance Dept. Review)	Ongoing

Number of District Enforced Measures: 3

APPENDIX B

TRAFFIC IMPACT REPORT

LIVE OAK ASSOCIATES, INC.
an Ecological Consulting Firm

LENNAR HOMES TRACT 848 BIOLOGICAL EVALUATION REPORT CITY OF LEMOORE, KINGS COUNTY, CALIFORNIA

By:

LIVE OAK ASSOCIATES, INC.

Austin Pearson, Director of Ecological Services
Anna Godinho, Staff Ecologist

For:

Jeff Callaway
Lennar Central Valley
8080 North Palm, Suite 110
Fresno, California 93711

February 18, 2020 Project No. 2446-01

Oakhurst: P.O. Box 2697 • 39930 Sierra Way, Suite B • Oakhurst, CA 93644 • Phone: (559) 642-4880 • Fax: (559) 642-4883
San Jose: 6840 Via Del Oro, Suite 220 • San Jose, CA 95119 • Phone: (408) 224-8300 • Fax: (408) 224-2411
Truckee: P.O. Box 8810 • Truckee, CA 96161 • Phone: (530) 214-8947

www.loainc.com

EXECUTIVE SUMMARY

Lennar Central Valley proposes to subdivide an approximate 80-acre property ("project area") into 362 lots (Tentative Tract Map No. 848 or "project") for future residential buildout. The project area is located in the City of Lemoore in Kings County, California. It is bounded by Bush Street to the north, Semas Avenue to the east, Pederson Street to the south, and College Avenue to the west.

Live Oak Associates, Inc. (LOA) conducted an investigation of the biotic resources of the project area and assessed potential project-related impacts to those resources pursuant to the California Environmental Quality Act (CEQA). The project area was surveyed in January 2020 for its biotic habitats, the plants and animals occurring in those habitats, and significant habitat values that may be protected by state and federal law.

Two biotic habitat/land use types were identified within the project area during the field survey: agricultural field and developed. All habitats of the project area are disturbed and of relatively low quality for most native wildlife.

The project has the potential to result in potentially significant impacts to the burrowing owl and San Joaquin kit fox in the unlikely event that individuals of these species are nesting/denning within or adjacent to the project area's marginal habitats at the time of construction. The project also has the potential to result in construction-related mortality/disturbance of nesting birds protected under California Fish and Game Code. Mortality of any of these animals would be considered a significant impact of the project under CEQA. By implementing the project during lower-risk times of year for these species, avoiding active nests and refugia identified during preconstruction surveys, providing environmental awareness training to construction workers, and, if necessary, passively relocating burrowing owls, the magnitude of these potential impacts can be reduced to a less than significant level.

No other biological resources would be significantly impacted by the project as defined by CEQA. Impacts would be less than significant for all locally occurring special status plant species, seven locally occurring special status animal species that would not be expected to occur within the project area, five species that would use the project area for foraging only, wildlife movement corridors, designated critical habitat, Waters of the U.S., and local policies and habitat conservation plans. Loss of habitat for special status animal species would not be considered a significant impact of the project under CEQA.

TABLE OF CONTENTS

1.0 INTRODUCTION

Lennar Central Valley proposes to subdivide an approximate 80-acre parcel ("project area") into 362 lots (Tentative Tract Map No. 848 or "project") for future residential buildout. The following technical report, prepared by Live Oak Associates, Inc. (LOA) in compliance with the California Environmental Quality Act (CEQA), describes the biotic resources of the project area, and evaluates potential impacts to those resources that could result from project implementation. The project area is located in the City of Lemoore in northern Kings County. It is bounded by Bush Street to the north, Semas Avenue to the east, Pederson Street to the south, and College Avenue to the west (Figure 1). It can be found on the *Lemoore* U.S. Geological Survey (USGS) 7.5-minute quadrangle within Sections 8 and 9 of Township 19 South, Range 20 East (Mt. Diablo Base and Meridian) (Figure 2).

1.1 PROJECT DESCRIPTION

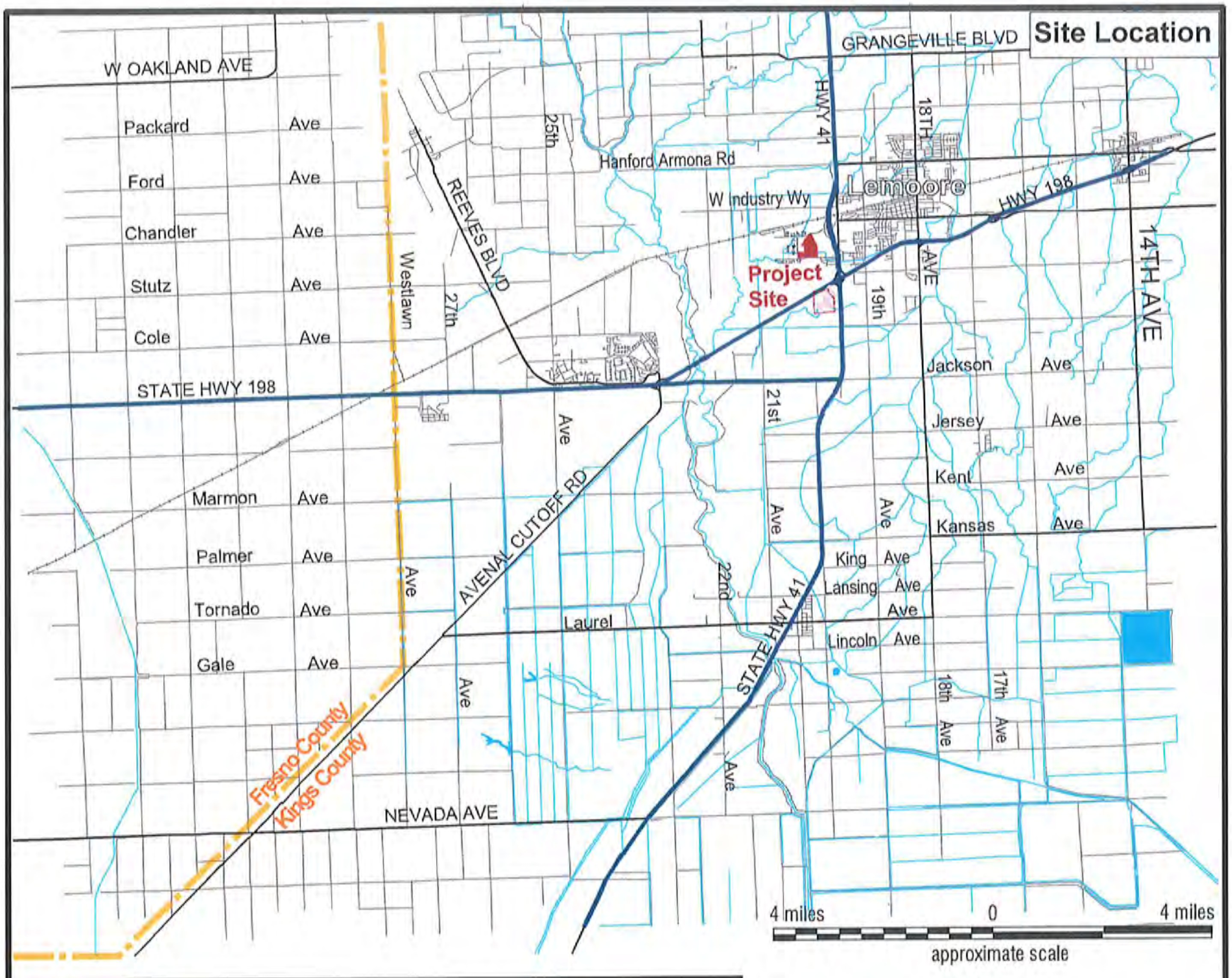
The project is a subdivision of approximately 80 acres into 362 residential lots and associated roads. Following project completion, it is assumed that the lots will be sold and full residential buildout of the project area will occur. The entire project area will be permanently impacted by future residential development facilitated by the project.

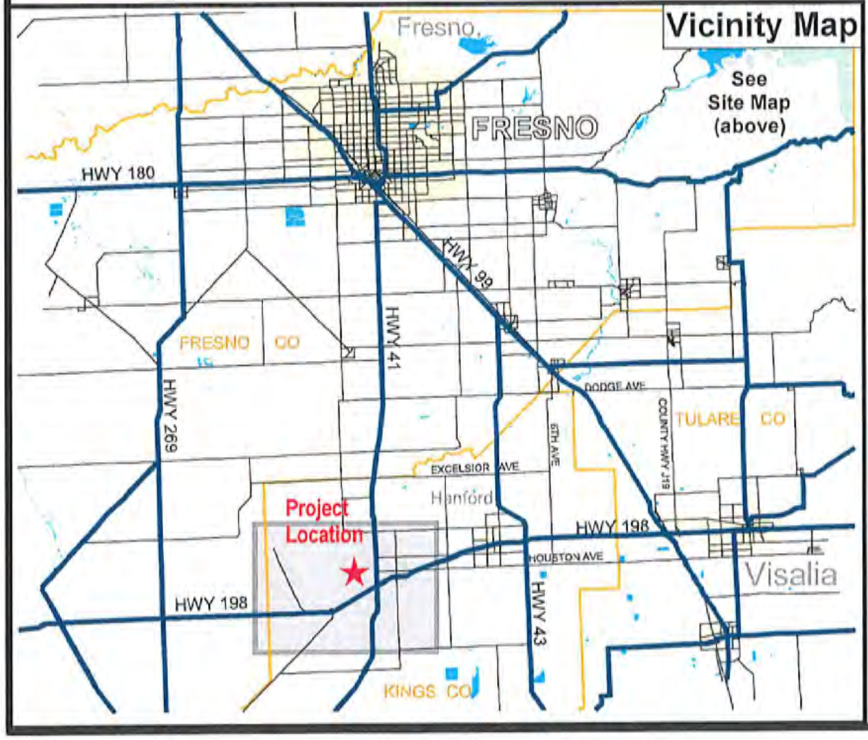
1.2 REPORT OBJECTIVES

Residential developments such as that proposed by Lennar Central Valley may damage or modify biotic habitats used by sensitive plant and animal species. In such cases, projects may be regulated by state or federal agencies, subject to provisions of CEQA, and/or subject to local policies and ordinances. In the case of Tract No. 848, environmental review under CEQA is required.

This report addresses issues related to: 1) sensitive biotic resources occurring in the project area; 2) the federal, state, and local laws regulating such resources; and 3) mitigation measures that may be required to reduce the magnitude of anticipated impacts and/or comply with permit requirements of state and federal resource agencies. As such, the objectives of this report are to:

- Summarize all site-specific information related to existing biological resources.

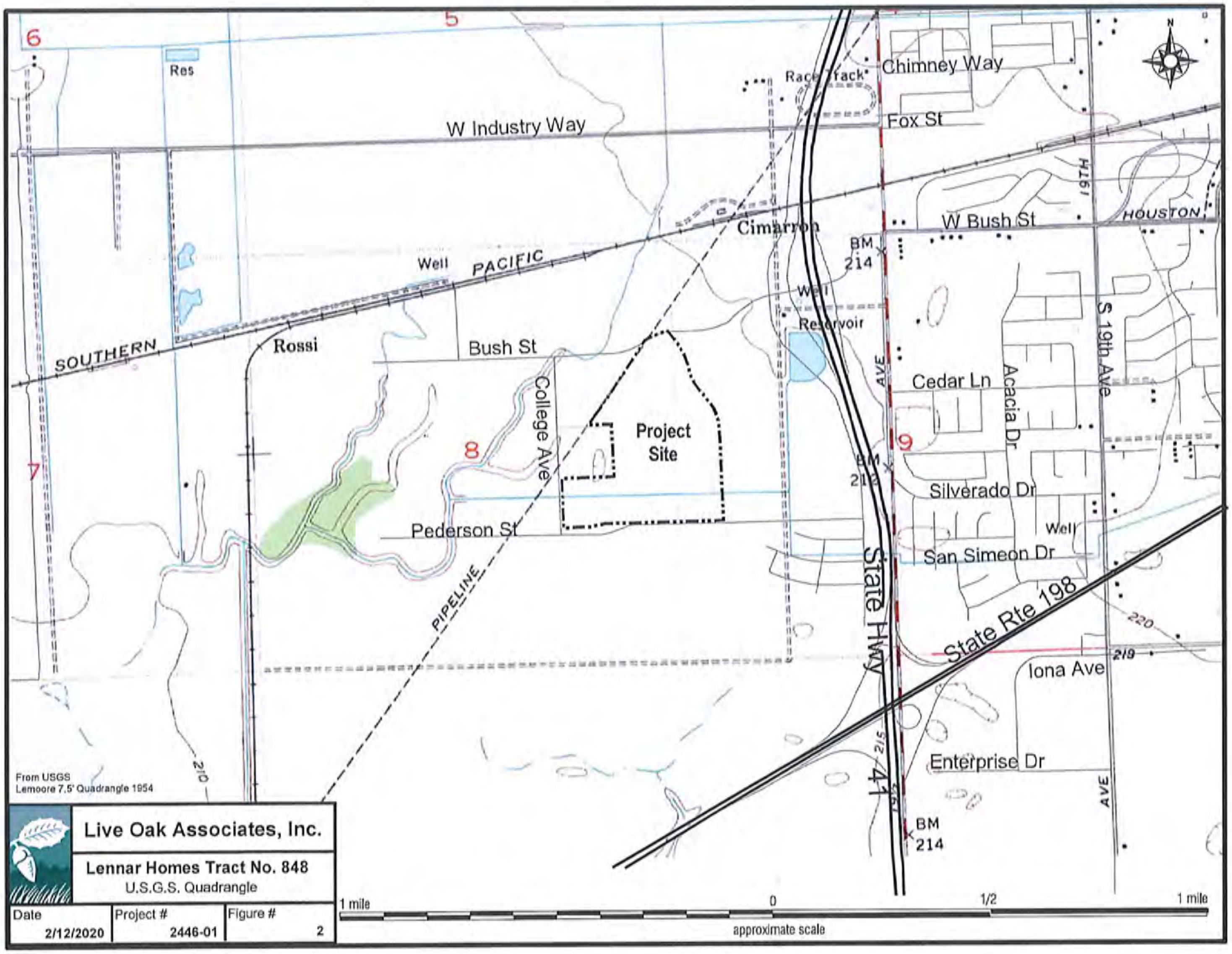




Live Oak Associates, Inc.

Lennar Homes Tract No. 848
Site / Vicinity Map

Date	Project #	Figure #
2/12/2020	2446-01	1



From USGS
Lemoore 7.5' Quadrangle 1954

Live Oak Associates, Inc.

Lennar Homes Tract No. 848
U.S.G.S. Quadrangle

Date	Project #	Figure #
2/12/2020	2446-01	2

- Make reasonable inferences about the biological resources that could occur on site based on habitat suitability and the proximity of the project area to a species' known range.
- Summarize all state and federal natural resource protection laws that may be relevant to project implementation.
- Identify and discuss project impacts to biological resources that may occur within the project area in the context of CEQA guidelines and relevant state and federal laws.
- Identify avoidance and mitigation measures that would reduce the magnitude of project impacts in a manner consistent with the requirements of CEQA and that are generally consistent with recommendations of the resource agencies regulating affected biological resources.

1.3 STUDY METHODOLOGY

A reconnaissance-level field survey of the project area was conducted on January 24, 2020 by LOA staff ecologist Anna Godinho. The survey consisted of driving and walking through the project area while identifying principal land uses and biotic habitats, identifying plant and animal species encountered, and assessing the suitability of the project area's habitats for special status species.

LOA conducted an analysis of potential project impacts based on the known and potential biotic resources of the project area. Sources of information used in the preparation of this analysis included: (1) the *California Natural Diversity Data Base* (CNDDB) (CDFW 2020), (2) the *Online Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2020), and (3) manuals, reports, and references related to plants and animals of the San Joaquin Valley region.

LOA's field investigation did not include a wetland delineation or focused surveys for special status species. The field survey was sufficient to generally describe those features of the project area that could be subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and/or the Regional Water Quality Control Board (RWQCB), and to assess the significance of possible biological impacts associated with development of the project area.

2.0 EXISTING CONDITIONS

2.1 REGIONAL SETTING

The project area is located in the San Joaquin Valley of California. The valley is a large, nearly flat alluvial plain bordered by the Sierra Nevada to the east, the Tehachapi Mountains to the south, the California coast ranges to the west, and the Sacramento-San Joaquin Delta to the north. Like most of California, the San Joaquin Valley experiences a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures commonly exceed 90 degrees Fahrenheit, and the relative humidity is generally very low. Winter temperatures rarely exceed 70 degrees Fahrenheit, with daytime highs often below 60 degrees Fahrenheit. Annual precipitation in the project vicinity varies considerably from year to year, but averages approximately 11 inches, almost all of which falls between the months of October and March (Western Regional Climate Center 2019). Nearly all precipitation falls in the form of rain.

The principal drainage of the project vicinity is the Kings River, which flows in a generally southern direction approximately 2 miles west of the project area. The Kings River historically contained large areas of riparian, wetland, and aquatic ecosystems that supported large populations of diverse native plants and animals. Presently, the Kings River supports only a fraction of the riparian habitat it once supported and the aquatic habitat has been greatly degraded from agricultural runoff and irregular flows. In essence, the river has been reduced to a series of distributary channels supplying water to farmland in the region.

The project area is located in the City of Lemoore, at the interface of urban and rural land uses. It is situated in a mosaic of agricultural lands and residential development. A small area of Valley sink scrub occurs approximately 2.5 miles to the south of the project area. Any native habitat that may have once occurred in the project area and adjacent lands would have been eliminated long ago when the terrain was converted for agricultural and residential development.

The project area is adjoined to the west by the West Hills College of Lemoore campus and an existing basin and solar array, both enclosed by a chain-link fence. At the time of the field survey, the basin contained standing water and hydrophytic vegetation, including a small stand of broadleaf cattail (*Typha latifolia*) at the western inlet. The project area is adjoined on all other sides by agricultural lands.

2.2 PROJECT AREA

At the time of the January 2020 field survey, the project area comprised an agricultural field and a pedestrian path (Figure 3). The topography consisted of nearly level land with an elevation of approximately 200 feet National Geodetic Vertical Datum (NGVD).

Two soil mapping units from two soil series were identified within the project area (Table 1). Soils of the project area have been highly modified through human activities. As a result, the onsite soil no longer supports its native soil characteristics and would therefore have no particular significance to biological resources of the project area.

Table 1. Soils of the Lennar Tract 848 Project Area.

Soil Mapping Unit	Parent Material	Drainage Class	Hydric?
Goldberg loam, partially drained	Alluvium derived from igneous and sedimentary rock	Somewhat poorly drained	Yes
Vanguard sandy loam, partially drained	Alluvium derived from igneous rock	Poorly drained	Yes

Source: Soil Survey Division, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions [Online WWW]. Available URL: "http://www.statlab.iastate.edu/soils/osd/" [Accessed February 10, 2020], and Hydric Soil Lists, Fresno County, March 1992, USDA Soil Conservation Service, Davis, California

2.3 BIOTIC HABITATS/LAND USES

Two biotic habitat/land use types were identified within the project area during the January 2020 field survey: agricultural field and developed. A list of the vascular plant species observed within the project area and the terrestrial vertebrates using, or potentially using, the site are provided in Appendices A and B, respectively. Photos of the project area are presented in Appendix C.

Live Oak Associates, Inc.

Lennar Homes Tract No. 848

Aerial Photograph

Date	Project #	Figure #
2/04/2020	2446-01	3

Sources:
Aerial Photo courtesy of USDA FSA Aerial Photography Field Office, Photo Date 1/29/2019

2.3.1 Agricultural Field

At the time of the field survey, the project area consisted almost entirely of portions of two agricultural fields. The fields were separated by an unnamed dirt road running north to south. The western field appeared to have been disced at some point in the recent past and no evidence of past or present crops was observed. Vegetation in this field consisted entirely of weedy herbaceous vegetation dominated by cheeseweed (*Malva parviflora*), fiddleneck (*Amsinckia* spp.), London rocket (*Sisymbrium irio*), and Bermudagrass (*Cynodon dactylon*), with large patches of Russian thistle (*Salsola tragus*) and two multi-trunked tamarisk (*Tamarix* sp.) trees measuring 10-15 feet in height. The eastern field consisted of recently harvested rows of a fodder crop, large patches of nettleleaf goosefoot (*Chenopodum murale*), and other common weedy species indicative of disturbed areas, with annual sunflower (*Helianthus annuus*), lambsquarters (*Chenopodium album*), and Johnsongrass (*Sorghum halapense*) growing densely along the southern margin. Irrigation standpipes, utility lines, and electrical meter boxes were observed along the southern margin of the two fields along the unpaved Pederson Avenue.

Intensive agricultural practices within the site's agricultural fields likely limit their value to wildlife; however, some wildlife species have the potential to occur here. Amphibians such as the Pacific chorus frog (*Pseudacris regilla*) and western toad (*Bufo boreas*) could breed in the off-site basin and subsequently disperse across the fields. Common reptiles could forage in the field, such as the western fence lizard (*Sceloporus occidentalis*) and Pacific gopher snake (*Pituophis catenifer catenifer*).

The site's agricultural fields provide foraging and nesting habitat for a variety of avian species. Likely foragers include resident birds such as the American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), and Brewer's blackbird (*Euphagus cyanocephalus*) (all observed), summer migrants such as the western kingbird (*Tyrannis verticalis*), and winter migrants such as the savannah sparrow (*Passerella sandwichensis*) and white-crowned sparrow (*Zonotrichia leucophrys*) (both observed). The disturbance-tolerant killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), and horned lark (*Eremophila alpestris*) (all observed) could nest within the fields in ground vegetation or in bare areas. Common ravens (*Corvus corax*) could nest on the utility poles, and black phoebes (*Sayornis nigricans*) and house finches (*Haemorhous mexicanus*) on the irrigation and electrical structures, that traverse the southern boundary of the fields. A number of common avian species could nest in the western field's tamarisk trees.

A few small mammal species may also occur within the agricultural fields of the site. Botta's pocket gopher (*Thomomys bottae*) burrow mounds were observed in the fields. California ground squirrels (*Otospermophilus beecheyi*) could burrow in the fields during intervals between activities, although no burrows were observed during the field survey. Other small mammals that may occur in the agricultural fields include the deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californicus*), black-tailed hare (*Lepus californicus*) (observed), and Audubon cottontail (Sy*lvilagus audubonii*).

The presence of amphibians, reptiles, birds and small mammals is likely to attract foraging raptors and mammalian predators. Common raptors such as the red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), and American kestrel (*Falco sparverius*) (observed), as well as various native bat species, would likely forage over the site's agricultural fields. Mammalian predators expected to occur in this habitat include disturbance-tolerant species such as the raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*).

2.3.2 Developed

The developed portion of the project area consisted of a portion of a pedestrian path along Bush Street. Although the asphaltic surface was mostly devoid of vegetation, there were several ornamental trees along the pedestrian path, including London planetree (*Plantanus* x *acerifolia*), crepe myrtle (*Lagerstroemia* sp.), and cherry (*Prunus* sp.). A variety of avian species could nest in these trees, and indeed several inactive nests were observed during the field survey.

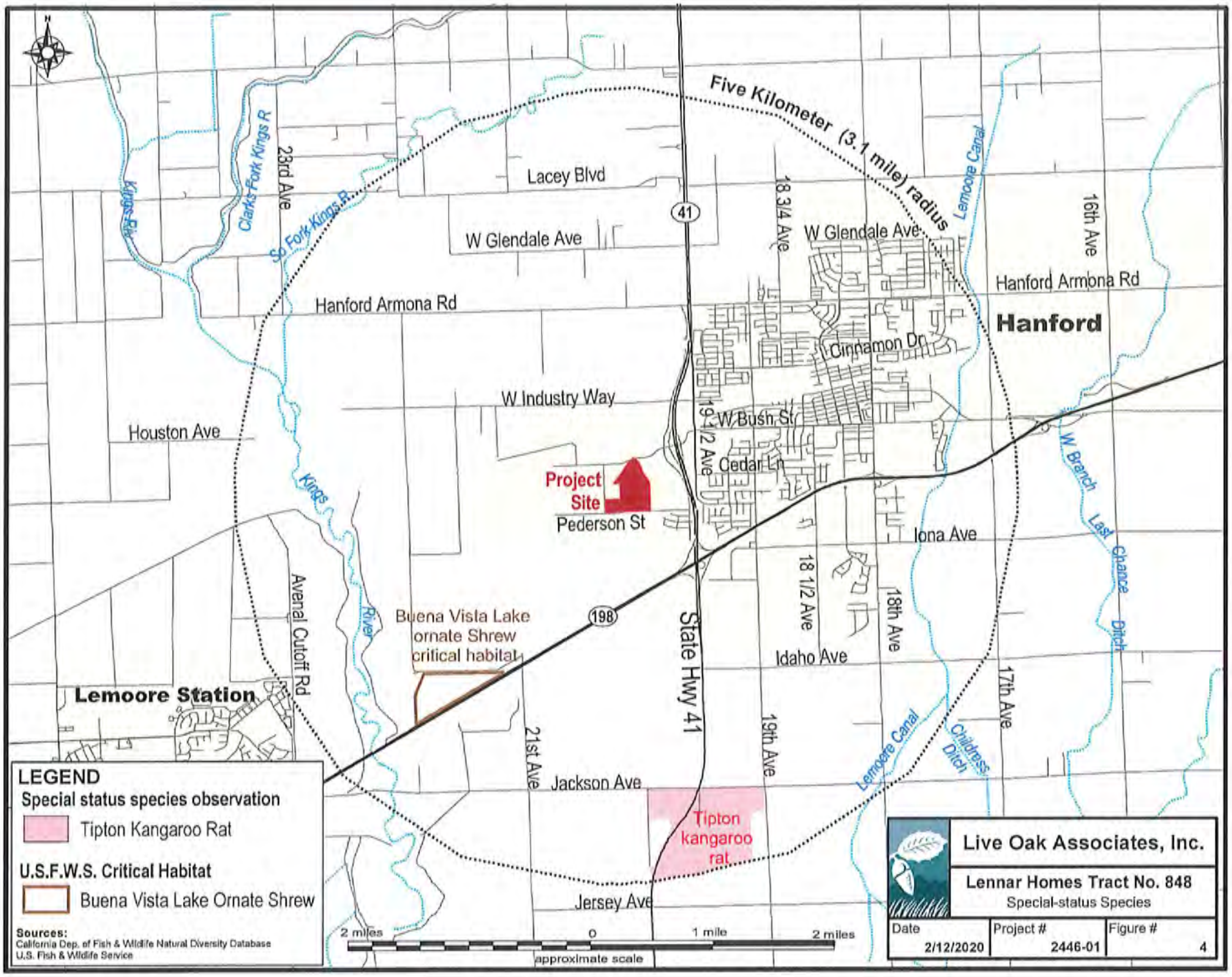
Native wildlife species utilizing the adjacent agricultural fields would be expected to occur in the developed portions of the project area from time to time. Several Botta's pocket gopher burrows were observed in the dirt shoulders along the pedestrian path.

2.4 SPECIAL STATUS PLANTS AND ANIMALS

Several species of plants and animals within the state of California have low populations, limited distributions, or both. Such species may be considered "rare" and are vulnerable to extirpation as the state's human population grows and the habitats these species occupy are converted to agricultural and urban uses. As described more fully in Section 3.1, state and federal laws have provided CDFW and the U.S. Fish and Wildlife Service (USFWS) with a mechanism for conserving and protecting the diversity of plant and animal species native to the state. A sizable number of native plants and animals have been formally designated as threatened or endangered under state and federal endangered species legislation. Still others have been designated as "species of special concern" by the CDFW. The California Native Plant Society (CNPS) has developed its own lists of native plants considered rare, threatened or endangered (CNPS 2020). Collectively, these plants and animals are referred to as "special status species."

The California Natural Diversity Data Base (CDFW 2020) was queried for special status species occurrences in the nine USGS 7.5-minute quadrangles containing and immediately surrounding the project area (*Lemoore, Vanguard, Hanford, Burrel, Riverdale, Laton, Westhaven, Stratford,* and *Guernsey*). These species, and their potential to occur within the project area, are listed in Table 2 on the following pages. Sources of information for this table included *California's Wildlife, Volumes I, II, and III* (Zeiner et. al 1988), *California Natural Diversity Data Base* (CDFW 2020), *The Jepson Manual: Vascular Plants of California, second edition* (Baldwin et al 2012), the *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2020), and Calflora.org.

Special status species occurrences within 5 kilometers (3.1 miles) of the project area are depicted in Figure 4, and Swainson's hawk (*Buteo swainsoni*) nesting locations and San Joaquin kit fox (*Vulpes macrotis mutica*) occurrences within 10 miles of the project area are depicted in Figure 5.



LEGEND

Special status species observation

🟥 Tipton Kangaroo Rat

U.S.F.W.S. Critical Habitat

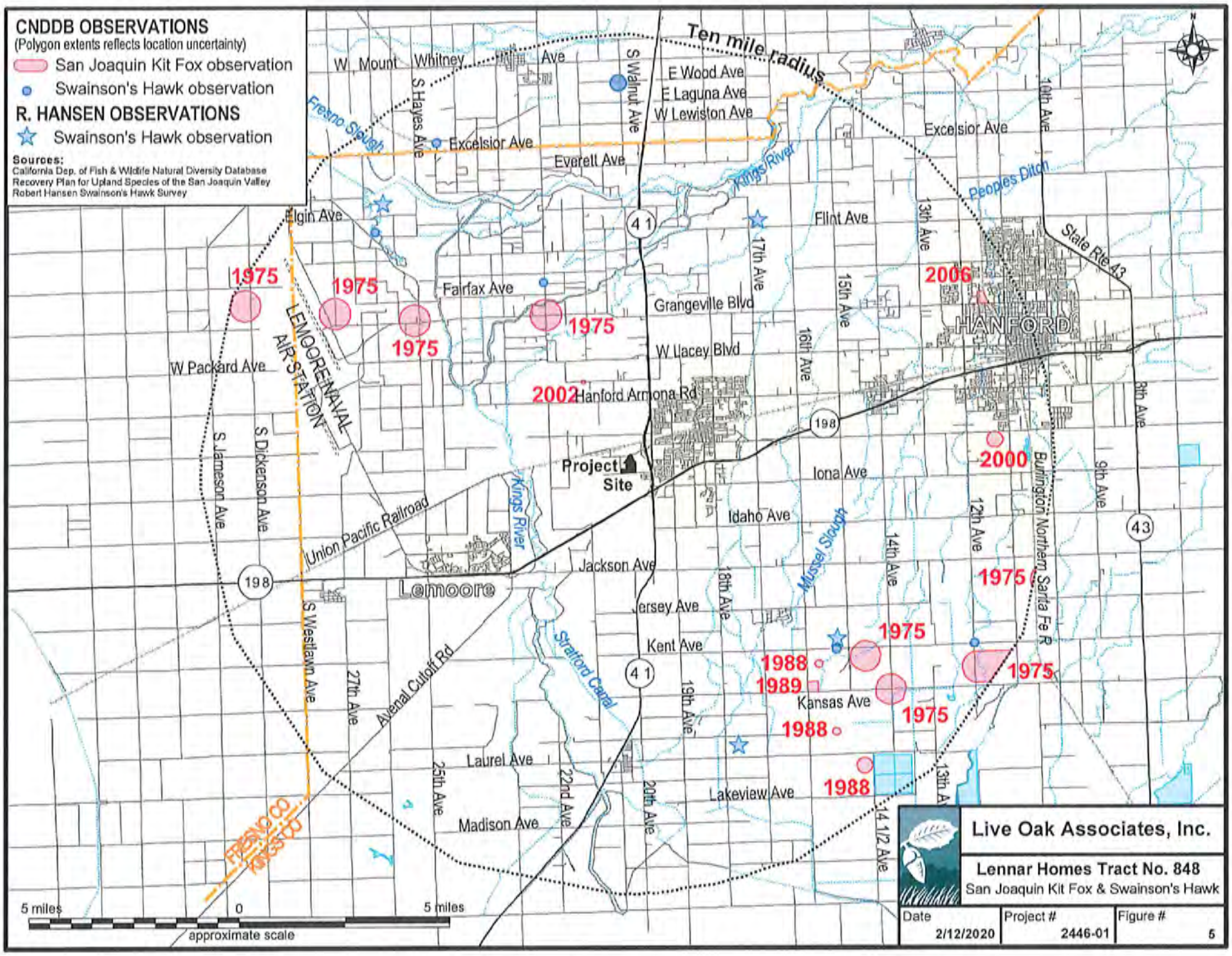
☐ Buena Vista Lake Ornate Shrew

Sources:
California Dep. of Fish & Wildlife Natural Diversity Database
U.S. Fish & Wildlife Service

Live Oak Associates, Inc.

Lennar Homes Tract No. 848
Special-status Species

Date	Project #	Figure #
2/12/2020	2446-01	4



Live Oak Associates, Inc.

Lennar Homes Tract No. 848
San Joaquin Kit Fox & Swainson's Hawk

Date	Project #	Figure #
2/12/2020	2446-01	5

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

PLANTS (adapted from CDFW 2020 and CNPS 2020)

CNPS Listed Plants

Species	Status	Habitat	Occurrence within the Project Area
Brittlescale (*Atriplex depressa*)	CNPS 1B	Occurs in relatively barren areas with alkaline clay soils in chenopod scrub, playas, Valley grasslands, and vernal pools up to 1,050 ft. in elevation. Blooms April through October.	**Absent.** Suitable habitat for this species is absent from the project area and adjacent lands. Any suitable habitat that may have been present has been eliminated by intensive human use.
Recurved Larkspur (*Delphinium recurvatum*)	CNPS 1B	Occurs on alkaline soils in chenopod scrub, cismontane woodland, and Valley and foothill grasslands between 985 and 2,000 ft. in elevation. Blooms March-June.	**Absent.** Suitable habitat for this species is absent from the project area and adjacent lands. Any suitable habitat that may have been present has been eliminated by intensive human use.
Panoche Pepper-Grass (*Lepidium jaredii* ssp. *album*)	CNPS 1B	Occurs in Valley and foothill grassland (steep slopes, clay, sometimes alkaline soils) habitat between 655 and 3,380 ft. in elevation. Blooms February-June.	**Absent.** Suitable habitat for this species is absent from the project area and adjacent lands. Any suitable habitat that may have been present has been eliminated by intensive human use.
California Alkali Grass (*Puccinellia simplex*)	CNPS 1B	Occurs in alkaline, clay soils in chenopod scrub, meadows and seeps, playas, Valley and foothill grassland, and vernal pools up to 3,000 ft. in elevation. Blooms March-May.	**Absent.** Suitable habitat for this species is absent from the project area and adjacent lands. Any suitable habitat that may have been present has been eliminated by intensive human use.

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS (adapted from CDFW 2020 and USFWS 2020)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	Occurrence within the Project Area
Blunt-nosed Leopard Lizard (*Gambelia silus*)	FE, CE, CP	Frequents open, sparsely vegetated areas within grasslands, alkali meadows, and chenopod scrub of the San Joaquin Valley from Merced south to Kern County.	**Absent.** Suitable habitat for this species is absent from the project area and adjacent lands. Any suitable habitat that may have been present has been eliminated by intensive human use. The only documented occurrence in the vicinity is approximately 8 miles southeast of the project area within Valley sink scrub habitat from 1990 (CDFW 2020). All other occurrences of this species are located over 20 miles away from the project area.
Giant Gartersnake (*Thamnophis gigas*)	FT, CT	Occurs in marshes, sloughs, drainage canals, irrigation ditches, rice fields, and adjacent uplands. Prefers locations with emergent vegetation for cover and open areas for basking.	**Absent.** Suitable aquatic habitat for this species is absent from the project area. Moreover, the site is well outside of the current known distribution of this species. The closest CNDDB occurrence of this species is located over 10 miles from the project area.
Western Snowy Plover (*Charadrius alexandrines nivosus*)	FT, CSC	Occurs along the coast from southern Washington to southern Baja California, and at interior locations including the Central Valley of California. Central Valley habitats typically used by this species include evaporation ponds, sewage ponds, reservoirs, and alkali lakes.	**Possible.** This species would not nest within the project area, although marginal foraging habitat is present. The adjacent basin is likely too small to offer suitable breeding habitat for this species. Snowy plovers were observed nesting in an agricultural basin complex approximately 3.5 miles south of the site in 1987 (CDFW 2020).
Swainson's Hawk (*Buteo swainsoni*)	CT	This breeding migrant to California nests in mature trees in riparian areas and oak savannah, and occasionally in lone trees at the margins of agricultural fields. Requires adjacent suitable foraging areas such as grasslands or alfalfa fields supporting rodent populations.	**Possible.** This species would be expected to occasionally forage across the project area, although suitable nesting habitat is absent. There are ten known nesting occurrences within a 10-mile radius of the project area; all but one are from the last 20 years. The closest known nesting occurrence is approximately 4.5 miles northwest of the project area from 2016 (CDFW 2020).
Tricolored Blackbird (TRBL) (*Agelaius tricolor*)	CT	Nests colonially near fresh water in dense cattails or tules, in thickets of willows or shrubs, and increasingly in grain fields. Forages in grassland and cropland areas.	**Possible.** Tricolored blackbirds may occasionally pass through or forage within the project area, but suitable nesting habitat is absent. The small stand of cattails lining the adjacent basin is likely too small to offer suitable colonial breeding habitat for this species. A nesting colony was documented approximately 5 miles west of the project area within vegetated retention ponds of the Lemoore Naval Air Station in 2008, although no birds were observed in subsequent years (CDFW 2020).

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS – **cont'd.**

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	**Status**	**Habitat**	**Occurrence within the Project Area**
Fresno Kangaroo Rat (*Dipodomys nitratoides exilis*)	FE, CE	Frequents alkali scrub and herbaceous habitats with scattered shrubs in the southwestern San Joaquin Valley.	**Absent.** The project area does not provide suitable habitat for the Fresno kangaroo rat. An isolated population has been documented within the Lemoore Naval Air Station approximately 7.5 miles northeast of the project area from 1993 (CDFW 2020).
Tipton Kangaroo Rat (*Dipodomys nitratoides nitratoides*)	FE, CE	Desert alkali scrub, annual grasslands; may forage in adjacent agricultural habitats.	**Absent.** The project area does not provide suitable habitat for the Tipton kangaroo rat. The closest known occurrence, recorded in 2008, is approximately 2.5 miles south of the project area in habitat described as uncultivated land with alkaline soils dominated by iodine bush (CDFW 2020).
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, CT	Frequents desert alkali scrub and annual grasslands and may forage in adjacent agricultural habitats. Utilizes enlarged (5 to 8 inches in diameter) ground squirrel burrows as denning habitat.	**Possible.** No burrows of suitable dimensions for kit fox denning were observed during the field survey. The site has been highly modified for agricultural use and, as a result, provides only marginal foraging and breeding habitat for the kit fox. This species is known from the project vicinity, however. There have been 14 documented sightings within a 10-mile radius of the project area, recorded between 1975 and 2006 (CDFW 2020). Individuals may occasionally pass through the site during dispersal movements.

TABLE 2. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS – cont'd.

State Species of Special Concern or California Fully Protected

Species	**Status**	**Habitat**	**Occurrence within the Project Area**
Western Spadefoot (*Spea hammondii*)	CSC	Mainly occurs in grasslands of San Joaquin Valley. Vernal pools or other temporary wetlands are required for breeding. Aestivates in underground refugia such as rodent burrows.	**Absent.** Suitable breeding habitat is absent from the project area and surrounding lands.
Western Pond Turtle (*Emys marmorata*)	CSC	Occurs in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with an abundance of vegetation, and either rocky or muddy bottoms in woodland, forest, and grasslands. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking. This species nests in open areas, on a variety of soil types, and up to ¼ mile away from water.	**Absent.** Suitable aquatic habitat is absent from the project area and surrounding lands.
California Glossy Snake (*Arizona elegans occidentalis*)	CSC	Occurs in arid scrub, rocky washes, grasslands, and chaparral.	**Absent.** The project area is outside of the known range of this species.
Burrowing Owl (*Athene cunicularia*)	CSC	Frequents open, dry annual or perennial grasslands, deserts, and scrublands characterized by low growing vegetation. Dependent upon burrowing mammals, most notably the California ground squirrel, for nest burrows.	**Possible.** Suitably sized burrows required by this species for nesting and cover were absent from the project area at the time of the field survey, and regular agricultural disturbance would likely discourage nesting or roosting by this species. However, the site's agricultural fields represent suitable foraging habitat for this species. The closest occurrence of this species is approximately 4.5 miles west of the project area from 2000 (CDFW 2020).
Loggerhead Shrike (*Lanius ludovicianus*)	CSC	Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low herbaceous cover. Can often be found in cropland.	**Present.** This species was observed foraging in the project area. Nesting habitat is present in the tamarisk trees and tumbleweeds on-site.
Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*)	CSC	Nests colonially in cattails, bulrushes or reeds in wetlands, mountain meadows, and marshes, ponds, and rivers. Forages in grassland and cropland areas.	**Possible.** Yellow-headed blackbirds may occasionally pass through or forage within the project area, but suitable nesting habitat is absent. The small stand of cattails lining the adjacent basin is likely too small to offer suitable colonial breeding habitat for this species. The closest occurrence of a nesting colony was recorded in Empire Canal approximately 6 miles southwest of the project area in 2016 (CDFW 2020).

EXPLANATION OF OCCURRENCE DESIGNATIONS AND STATUS CODES

Present: Species observed on the site at time of field surveys or during recent past
Likely: Species not observed on the site, but it may reasonably be expected to occur there on a regular basis
Possible: Species not observed on the site, but it could occur there from time to time
Unlikely: Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient
Absent: Species not observed on the site, and precluded from occurring there due to absence of suitable habitat

STATUS CODES

FE	Federally Endangered	CE	California Endangered
FT	Federally Threatened	CT	California Threatened
FPE	Federally Endangered (Proposed)	CCT	California Threatened (Candidate)
FPT	Federally Threatened (Proposed)	CFP	California Fully Protected
FC	Federal Candidate	CSC	California Species of Special Concern

CNPS LISTING

1A	Plants Presumed Extinct in California	2	Plants Rare, Threatened, or Endangered in California, but more common elsewhere
1B	Plants Rare, Threatened, or Endangered in California and elsewhere		

2.5 ENDANGERED, THREATENED, OR SPECIAL STATUS PLANT AND ANIMAL SPECIES MERITING FURTHER DISCUSSION

2.5.1 Swainson's Hawk (*Buteo swainsoni*). Federal Listing Status: None; State Listing Status: Threatened.

Ecology of the species. Swainson's hawks are large, long-winged, broad-tailed hawks with a high degree of mate and territorial fidelity. They are breeding season migrants to California, arriving at their nesting sites in March or April. The young hatch sometime between March and July and fledge 4 to 6 weeks later. By October, most birds have left for wintering grounds in South America. In the Central Valley, Swainson's hawks typically nest in large trees along riparian systems, but may also nest in oak groves, or lone, mature trees in agricultural fields or along roadsides. Nest sites are typically located adjacent to suitable foraging habitat.

Swainson's hawks forage in large, open fields with abundant prey, including grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row crops, primarily during or immediately after harvest (Estep 1989, Estep and Dinsdale 2012). In the Central Valley, California voles account for about 45% of non-insect prey taken by the Swainson's hawk, followed by ground birds (32%) and pocket gophers, deer mice, and other small mammals (20%) (Estep 1989). Insects comprise a large proportion of individual prey items, but a negligible proportion of total prey biomass. The designation of the Swainson's hawk as Threatened under the California Endangered Species Act is based on population decline due in part to loss of foraging habitat to urban development (CDFG 1994).

Potential to occur onsite. The CNDDB lists six nesting occurrences within a 10-mile radius of the project area (CDFW 2020), in addition to four nesting records compiled by local ornithologist, Rob Hansen (2017). All but one of these occurrences are from the last 20 years, between 2003 and 2017. However, suitable nesting habitat is absent from the project area and surrounding lands, and Swainson's hawks are not known to nest within high-density residential Lemoore where the project area is located. The closest documented nesting occurrence is located approximately 4.5 miles northwest of the project area, and the closest potentially suitable nesting habitat is located approximately two miles west of the project area, along the Kings River. The habitats of the project area may occasionally be used for foraging by the Swainson's hawk, although this species would not nest on or adjacent to the site.

2.6 JURISDICTIONAL WATERS

Jurisdictional waters are those rivers, creeks, drainages, lakes, ponds, reservoirs, and wetlands that are subject to the authority of the USACE, CDFW, and/or the RWQCB. In general, the USACE regulates navigable waters, tributaries to navigable waters, and wetlands adjacent to these waters, where wetlands are defined by the presence of hydric soils, hydrophytic vegetation, and wetland hydrology. The CDFW has jurisdiction over waters in California that have a defined bed and bank, and the RWQCB has jurisdiction over California surface water and groundwater. The regulation of jurisdictional waters is discussed in more detail in Section 3.2.5. Jurisdictional waters are absent from the project area and adjacent lands.

2.7 SENSITIVE NATURAL COMMUNITIES

California contains a wide range of natural communities, or unique assemblages of plants and animals. These communities have largely been classified and mapped by CDFW as part of its natural heritage program. Natural communities are assigned state and global ranks according to their rarity and the magnitude and trend of the threats they face. Any natural community with a state rank of 3 or lower (on a 1-5 scale) is considered "sensitive" and must be considered in CEQA review. Examples of sensitive natural communities in the Central Valley include various types of riparian woodlands, alkaline seeps and sinks, marshes, and vernal pools.

Sensitive natural communities are absent from the project area and adjacent lands.

2.8 WILDLIFE MOVEMENT CORRIDORS

Wildlife movement corridors are routes that animals regularly and predictably follow during seasonal migration, dispersal from native ranges, daily travel within home ranges, and inter-population movements. Movement corridors in California are typically associated with valleys, rivers and creeks supporting riparian vegetation, and ridgelines.

The project area does not contain features that would be likely to function as wildlife movement corridors. However, the Pacific flyway, one of four major bird migration routes in North America, passes over the project area and much of the rest of California.

2.9 DESIGNATED CRITICAL HABITAT

The USFWS often designates areas of "critical habitat" when it lists species as threatened or endangered. Critical habitat is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Designated critical habitat for the Buena Vista Lake ornate shrew (*Sorex ornatus relictus*) is located approximately 1.5 miles southwest of the project area. Designated critical habitat is absent from the project area itself, and the site does not contain wetland or riparian habitat that could support this species.

3.0 IMPACTS AND MITIGATIONS

3.1 SIGNIFICANCE CRITERIA

In California, any project carried out or approved by a public agency that will result in a direct or reasonably foreseeable indirect physical change in the environment must comply with CEQA. The purpose of CEQA is to ensure that a project's potential impacts on the environment are evaluated, and methods for avoiding or reducing these impacts are considered, before the project is allowed to move forward. A secondary aim of CEQA is to provide justification to the public for the approval of any projects involving significant impacts on the environment.

According to Section 15382 of the CEQA Guidelines, a significant effect on the environment means a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic interest." Although the lead agency may set its own CEQA significance thresholds, project impacts to biological resources are generally considered to be significant if they would meet any of the following criteria established in Appendix G of the CEQA Guidelines:

- 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 CDFW or USFWS.

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.

- 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.

- 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.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Furthermore, CEQA Guidelines Section 15065(a) requires the lead agency to make "mandatory findings of significance" if there is substantial evidence that a project may:

- 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, or substantially reduce the number or restrict the range of an endangered, rare or threatened species.
- Achieve short-term environmental goals to the detriment of long-term environmental goals.
- Produce environmental effects that are individually limited but cumulatively considerable, meaning that the incremental effects of the project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects.

3.2 RELEVANT GOALS, POLICIES, AND LAWS

3.2.1 General Plan Policies of County of Kings

In compliance with CEQA, the lead agency must consider conformance with applicable goals and policies of the General Plans of the County of Kings. Relevant resource conservation goals of the Kings County General Plan include 1) protecting the Kings River and associated riparian habitat, 2) preserving land that contains important natural plant and animal habitats, 3) maintaining the quality of natural wetland areas, 4) protecting and managing riparian environments as valuable resources, 5) protecting habitats supporting rare, endangered, or threatened species, and 6) providing mitigation measures to protect important plant and wildlife habitats.

3.2.2 Threatened and Endangered Species

In California, imperiled plants and animals may be afforded special legal protections under the California Endangered Species Act (CESA) and/or Federal Endangered Species Act (FESA). Species may be listed as "threatened" or "endangered" under one or both Acts, and/or as "rare" under CESA. Under both Acts, "endangered" means a species is in danger of extinction throughout all or a significant portion of its range, and "threatened" means a species is likely to become endangered within the foreseeable future. Under CESA, "rare" means a species may become endangered if their present environment worsens. Both Acts prohibit "take" of listed species, defined under CESA as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code, Section 86), and more broadly defined under FESA to include "harm" (16 USC, Section 1532(19), 50 CFR, Section 17.3).

When state and federally listed species have the potential to be impacted by a project, the USFWS and CDFW must be included in the CEQA process. These agencies review the environmental document to determine the adequacy of its treatment of endangered species issues and to make project-specific recommendations for the protection of listed species. Projects that may result in the "take" of listed species must generally enter into consultation with the USFWS and/or CDFW pursuant to FESA and CESA, respectively. In some cases, incidental take authorization(s) from these agencies may be required before the project can be implemented.

3.2.3 Migratory Birds

The Federal Migratory Bird Treaty Act (FMBTA: 16 USC 703-712) prohibits killing, possessing, or trading in any bird species covered in one of four international conventions to which the United States is a party, except in accordance with regulations prescribed by the Secretary of the Interior. The name of the act is misleading, as it actually covers almost all birds native to the United States, even those that are non-migratory. The FMBTA encompasses whole birds, parts of birds, and bird nests and eggs.

Although the USFWS and its parent administration, the U.S. Department of the Interior, have traditionally interpreted the FMBTA as prohibiting incidental as well as intentional "take" of birds, a January 2018 legal opinion issued by the Department of the Interior now states that incidental take of migratory birds while engaging in otherwise lawful activities is permissible under the FMBTA. However, California Fish and Game Code makes it unlawful to take or possess any non-game bird covered by the FMBTA (Section 3513), as well as any other native non-game bird (Section 3800), even if incidental to lawful activities.

3.2.4 Birds of Prey

Birds of prey are protected in California under provisions of the Fish and Game Code (Section 3503.5), which states that it is unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks and eagles) or Strigiformes (owls), as well as their nests and eggs. The bald eagle and golden eagle are afforded additional protection under the federal Bald and Golden Eagle Protection Act (16 USC 668), which makes it unlawful to kill birds or their eggs.

3.2.5 Wetlands and Other "Jurisdictional Waters"

Natural drainage channels and adjacent wetlands may be considered "waters of the United States" or "jurisdictional waters" subject to the jurisdiction of the USACE. The extent of jurisdiction has been defined in the Code of Federal Regulations but has also been subject to interpretation of the federal courts. Jurisdictional waters generally include:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands:
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce;
- All impoundments of waters otherwise defined as waters of the United States under the definition;
- Tributaries of waters identified in paragraphs (a)(1)-(4) (i.e. the bulleted items above).

As determined by the United States Supreme Court in its 2001 Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC) decision, channels and wetlands isolated from other jurisdictional waters cannot be considered jurisdictional on the basis of their use, hypothetical or observed, by migratory birds. Similarly, in its 2006 consolidated Carabell/Rapanos decision, the U.S. Supreme Court ruled that a significant nexus between a wetland and other navigable waters must exist for the wetland itself to be considered a navigable and therefore jurisdictional water.

The USACE regulates the filling or grading of Waters of the U.S. under the authority of Section 404 of the Clean Water Act. The extent of jurisdiction within drainage channels is defined by "ordinary high water marks" on opposing channel banks. All activities that involve the discharge of dredge or fill material into Waters of the U.S. are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that result in no net loss of wetland functions or values. No permit can be issued until the RWQCB issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet state water quality standards.

Under the Porter-Cologne Water Quality Control Act of 1969, the State Water Resources Control Board has regulatory authority to protect the water quality of all surface water and groundwater in the State of California ("Waters of the State"). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region regulates discharges of fill or pollutants into Waters of the State through the issuance of various permits and orders. Discharges into Waters of the State that are also Waters of the U.S. require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining certain federal permits, such as a Section 404 Clean Water Act permit. Discharges into all Waters of the State, even those that are not also Waters of the U.S., require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB. The RWQCB also administers the Construction Storm Water Program and the federal National Pollution Discharge Elimination System (NPDES) program. Projects that disturb one or more acres of soil must obtain a Construction General Permit under the Construction Storm Water Program. A prerequisite for this permit is the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Projects that discharge wastewater, storm water, or other pollutants into a Water of the U.S. may require a NPDES permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a Notification of Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.

3.3. POTENTIALLY SIGNIFICANT PROJECT IMPACTS AND MITIGATIONS

As described in Section 1.0 of this report, the proposed project is the subdivision of a 80-acre property into 362 residential lots. Approval of the subdivision will facilitate development of the site for residential use. This impact analysis assumes that the entirety of the project area will be permanently impacted by future buildout.

3.3.1 Potential Project-Related Impacts to Nesting Migratory Birds and Raptors, including the Loggerhead Shrike

Potential Impacts. A variety of common birds protected under California Fish and Game Code could be expected to nest within and adjacent to the project area, including the loggerhead shrike (*Lanius ludovicianus*), a California Species of Special Concern. For example, the killdeer may nest on bare dirt or gravel surfaces, and the mourning dove may nest in ground vegetation within the agricultural fields. The project area's trees could be used by a number of common species including the American robin and northern mockingbird, and the irrigation and electrical structures could be used by the black phoebe or house finch. If birds were to be nesting on or adjacent to the project area during future construction activities on site, such activities could result in the abandonment of active nests or direct mortality to birds. Construction mortality of nesting birds or disturbance leading to nest abandonment would violate state laws (see Section 3.2.2) and be considered a significant project-related impact as defined by CEQA.

Mitigation. The following measures will be implemented for the protection of nesting migratory birds and raptors, including the loggerhead shrike.

> ***Measure 3.3.1a (Avoidance).*** If feasible, future construction activities will occur outside of the avian nesting season, typically defined as February 1 to August 31.
>
> ***Measure 3.3.1b (Pre-construction Surveys).*** If vegetation removal, grading, or construction must occur between February 1 and August 31, a qualified biologist will conduct pre-construction surveys on and within 250 feet of the project area for active migratory bird nests within 14 days of the onset of these activities.
>
> ***Mitigation 3.3.1c (Establish Buffers).*** Should any active nests be discovered in or near proposed construction zones, the biologist will identify a suitable construction-free buffer around the nest. This buffer will be identified on the ground with flagging or fencing, and will be maintained until the biologist has determined that the young have fledged.

Implementation of the above measures will reduce potential project-related impacts to nesting migratory birds and raptors, including the loggerhead shrike, to a less than significant level under CEQA and ensure compliance with state laws protecting these species.

3.3.2 Potential Project-Related Impacts to Burrowing Owls from Construction Mortality

Potential Impacts. Evidence of past or present burrowing owl occupation of the project area was not observed during field survey, and burrows of suitable dimensions for burrowing owl nesting and cover were absent from the project area. However, if burrowing owls were to move onto the site prior to future residential construction, construction activities could result in the mortality of burrowing owls, as they are known to retreat into their burrows ahead of heavy equipment. Mortality of individual burrowing owls would constitute a violation of state law and a significant project-related impact as defined by CEQA.

Mitigation. The following measures will be implemented for the protection of the burrowing owl.

> ***Mitigation Measure 3.3.2a (Take Avoidance Survey).*** A take avoidance survey for burrowing owls will be conducted by a qualified biologist between 14 and 30 days prior to the start of future residential construction. This take avoidance survey will be conducted according to methods described in the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). The survey area will include all suitable habitat on and within 200 meters of project impact areas, where accessible.

> ***Mitigation Measure 3.3.2b (Avoidance of Active Nests and Roosts).*** If project activities are undertaken during the breeding season (February 1-August 31) and active nest burrows are identified within or near project impact areas, a 200-meter disturbance-free buffer will be established around these burrows. During the non-breeding season (September 1-January 31), resident owls occupying burrows in or near project impact areas will be avoided through the establishment of a 50-meter disturbance-free buffer or passively relocated to alternative habitat as described below. Smaller buffer areas during the non-breeding season may be implemented with the presence of a qualified biological monitor during all activities occurring within 50 meters of occupied burrows. Buffers will remain in place for the duration of project activities occurring within the vicinity of burrowing owl activity.

> ***Mitigation Measure 3.3.2c (Passive Relocation of Resident Owls).*** During the non-breeding season (September 1-January 31), resident owls occupying burrows in project impact areas may be passively relocated to alternative habitat in accordance with a relocation plan prepared by a qualified biologist.

Compliance with the above mitigation measures will reduce impacts to burrowing owls to a less than significant level and ensure compliance with state laws protecting this species.

3.3.3 Potential Project-Related Impacts to San Joaquin Kit Foxes from Construction Mortality

Potential Impacts. The project area consists of lands that have experienced regular human disturbance for decades, and onsite habitat for this species is considered marginal, at best. No burrows of suitable size for kit fox use were observed and no sign of kit fox use was observed during the field survey. While it is unlikely kit fox have or would take up residence on the project area under current site conditions, kit fox individuals may pass through and possibly forage on the site from time to time during dispersal movements. If kit fox were present at the time of future residential construction, then construction activities would have the potential to cause kit fox mortality. Kit fox mortality as a result of the project is a potentially significant impact.

Mitigation. The following measures adapted from the U.S. Fish and Wildlife Service 2011 *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (Appendix D) will be implemented.

> ***Mitigation Measure 3.3.3a (Pre-construction Surveys).*** Preconstruction surveys for the San Joaquin kit fox shall be conducted on and within 200 feet of the project area, no less than 14 days and no more than 30 days prior to the start of ground disturbance activities

associated with future residential construction. The primary objective is to identify kit fox habitat features (e.g., potential dens and refugia) on and adjacent to the site and evaluate their use by kit foxes.

Mitigation Measure 3.3.3b (Avoidance). Should active kit fox dens be detected during preconstruction surveys, the Sacramento Field Office of the USFWS and the Fresno Field Office of CDFW will be notified. A disturbance-free buffer will be established around the burrows in consultation with the USFWS and CDFW, to be maintained until an agency-approved biologist has determined that the burrows have been abandoned.

Mitigation Measure 3.3.3c (Minimization). Future residential construction activities shall be carried out in a manner that minimizes disturbance to kit foxes in accordance with the USFWS *Standardized Recommendations*. The applicant shall implement all minimization measures presented in the Construction and On-going Operational Requirements section of the *Standardized Recommendations*, including, but not limited to: restriction of project-related vehicle traffic to established roads, construction areas, and other designated areas; inspection and covering of structures (e.g. pipes), as well as installation of escape structures, to prevent the inadvertent entrapment of kit foxes; restriction of rodenticide and herbicide use; and proper disposal of food items and trash. See Appendix D for more details.

Mitigation Measure 3.3.3d (Employee Education Program). Prior to the start of future residential construction, the applicant will retain a qualified biologist to conduct a tailgate meeting to train all construction staff that will be involved with the project on the San Joaquin kit fox. This training will include a description of the kit fox and its habitat needs; a report of the occurrence of kit fox in the project vicinity; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of the measures being taken to reduce impacts to the species during project construction and implementation. The training will include a handout with all of the training information included in it. The applicant will use this handout to train any construction personnel that were not in attendance at the first meeting, prior to those personnel starting work on the site.

Mitigation Measure 3.3.3e (Mortality Reporting). The Sacramento Field Office of the USFWS and the Fresno Field Office of CDFW will be notified in writing within three working days in case of the accidental death or injury of a San Joaquin kit fox during project-related activities. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and any other pertinent information.

Implementation of these measures will reduce impacts to the San Joaquin kit fox to a less than significant level and would minimize the risk that construction activities during future residential development would result in mortality to individual kit foxes.

3.4 LESS THAN SIGNIFICANT PROJECT IMPACTS

3.4.1 Project-Related Impacts to Special Status Plant Species

Potential Impacts. Four special status plant species have been documented in the project vicinity. These include brittlescale (*Atriplex depressa*), recurved larkspur (*Delphinium recurvatum*), Panoche pepper-grass (*Lepidium jaredii* ssp. *album*), and California alkali grass (*Puccinellia simplex*). All of these species are considered absent from the project area due to past and ongoing disturbance, the absence of suitable habitat, and/or the project area's being situated outside of the elevational range of the species. Project-related impacts to these four special status plant species are considered less than significant under CEQA.

Mitigation. Mitigation measures are not warranted.

3.4.2 Project-Related Impacts to Special Status Animal Species Absent from, or Unlikely to Occur within, the Project Area

Potential Impacts. Seven regionally occurring special status animal species are considered absent or unlikely to occur within the project area due to past and ongoing disturbance of the project area and surrounding lands, the absence of suitable habitat, and/or the project area's being situated outside of the species' known distribution. These comprise the blunt-nosed leopard lizard (*Gambelia silus*), giant gartersnake (*Thamnophis gigas*), Fresno kangaroo rat (*Dipodomys nitratoides exilis*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), western spadefoot (*Spea hammondii*), western pond turtle (*Emys marmorata*), and California glossy snake (*Arizona elegans occidentalis*). Future residential construction does not have the potential to significantly impact these seven species through construction mortality or loss of habitat because there is little or no likelihood that they are present.

Mitigation. Mitigation is not warranted.

3.4.3 Project-Related Impacts to Special Status Animals that would Use the Project Area for Foraging Only

Four special status animal species, the tricolored blackbird (*Agelaius tricolor*), Swainson's hawk, western snowy plover (*Charadrius montanus*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*), all have the potential to forage in the project area from time to time, but would not nest on site or near enough to the site to be disturbed by future residential construction activities. These species would not be at risk of construction-related injury or mortality because they are highly mobile while foraging, and would be expected to simply fly away from construction disturbance. Although the project area's agricultural fields would no longer be available as foraging habitat following residential buildout, these species are expected to use this field infrequently under existing conditions given the project area's proximity to high-density residential development of Lemoore and the adjacent college campus, both expected to create high levels of ambient disturbance. Moreover, these species are not known to nest very close to the project area and/or their nearby occurrences are historical in nature, and similar or higher quality habitats are regionally abundant. Tricolored blackbird, Swainson's hawk, western snowy plover, and yellow-headed blackbird individuals and local populations would not be substantially affected by future buildout of the project area, and project-related impacts to these species are considered less than significant under CEQA.

Mitigation. Mitigations are not warranted.

3.4.4 Potential Project-Related Impacts to Jurisdictional Waters

Potential Impacts. Waters of the U.S. and state are absent from the site.

Mitigation. Mitigations are not warranted.

3.4.5 Project-Related Impacts to Wildlife Movement Corridors

Potential Impacts. The project area does not contain features likely to function as a wildlife movement corridor. Future buildout of the site will have no effect on the Pacific flyway; birds using the flyway will continue to do so during and following construction.

Mitigation. The project will have no effect on wildlife movement corridors. Mitigation is not warranted.

3.4.6 Project-Related Impacts to Critical Habitat

Potential Impacts. The project will have no effect on designated critical habitat because critical habitat is absent from the project area.

Mitigation. Mitigation is not warranted.

3.4.7 Local Policies or Habitat Conservation Plans

Potential Impacts. The project appears to be in compliance with all provisions of County of Kings General Plan polices. See Appendix E for the County of Kings General Plan policies pertaining to biological resources. No known Habitat Conservation Plans are in effect for the area.

Mitigation. No mitigations are warranted.

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APPENDIX A: VASCULAR PLANTS OF THE PROJECT AREA

APPENDIX A: VASCULAR PLANTS OF THE PROJECT AREA

The vascular plant species listed below were observed within the project area during a site survey conducted by Live Oak Associates, Inc. within Lennar Homes Tract 848 on January 24, 2020. The U.S. Fish and Wildlife Service wetland indicator status of each plant has been shown following its common name.

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland
NR - No review
NA - No agreement
NI - No investigation

ASTERACEAE – Sunflower Family		
Helianthus annuus	Common Sunflower`	FACU
Lactuca serriola	Prickly Lettuce	FACU
Sonchus oleraceus	Common Sowthistle	UPL
BRASSICACEAE – Mustard Family		
Brassica nigra	Black Mustard	UPL
Capsella bursa-pastoris	Shepherd's Purse	FACU
Sisymbrium irio	London Rocket	UPL
BORAGINACEAE – Borage Family		
Amsinckia spp.	Fiddleneck	FAC
CHENOPODIACEAE – Goosefoot Family		
Chenopodium album	Lambsquarters	FACU
Chenopodium murale	Nettleleaf Goosefoot	FACU
Salsola tragus	Russian Thistle	FACU
GERANIACEAE – Geranium Family		
Erodium cicutarium	Redstem Filaree	UPL
LAMIACEAE – Mint Family		
Marrubium vulgare	Horehound	FACU
LYTHRACEAE- Loosestrife Family		
Lagerstromia sp.	Crepe Myrtle	-
MALVACEAE – Mallow Family		
Malva parviflora	Cheeseweed	UPL
Malvella leprosa	Alkali Mallow	FACU
PLATANACEAE – Plane-Tree Family		
Platanus ×acerifolia	London Planetree	-
POACEAE – Grass Family		
Bromus spp.	Brome	-
Cynodon dactylon	Bermudagrass	FACU
Distichlis spicata	Saltgrass	FAC

Hordeum murinum	Mouse Barley	FACU
Leptochloa fusca uninervia	Mexican Sprangletop	UPL
Phalaris minor	Littleseed Canarygrass	UPL
Sorghum halepense	Johnson Grass	FACU
POLYGONACEAE – Buckwheat Family		
Polygonum aviculare	Prostrate Knotweed	FAC
Rumex crispus	Curly Dock	FAC
Rumex dentatus	Toothed Dock	FACW
ROSACEAE – Rose Family		
Prunus sp.	Stone Fruit	-

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON THE PROJECT AREA

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR WITHIN THE PROJECT AREA

The species listed below are those that may reasonably be expected to use the habitats of the project area routinely or from time to time. The list was not intended to include birds that are vagrants or occasional transients. Terrestrial vertebrate species observed in or adjacent to the project area by LOA on January 24, 2020 have been noted with an asterisk.

CLASS: AMPHIBIA
ORDER: ANURA (Frogs and Toads)
FAMILY: BUFONIDAE (True Toads)
Western Toad (*Bufo boreas*)
FAMILY: HYLIDAE (Treefrogs and Relatives)
Pacific Chorus Frog (*Pseudacris regilla*)
FAMILY: RANIDAE (True Frogs)
American Bullfrog (*Lithobates catesbeianus*)
CLASS: REPTILIA
ORDER: SQUAMATA (Lizards and Snakes)
SUBORDER: SAURIA (Lizards)
FAMILY: PHRYNOSOMATIDAE
Side-Blotched Lizard (*Uta stansburiana*)
Western Fence Lizard (*Sceloporus occidentalis*)
FAMILY: TEIIDAE (Whiptails and relatives)
Western Whiptail (*Cnemidophorus tigris*)
SUBORDER: SERPENTES (Snakes)
FAMILY: COLUBRIDAE (Colubrids)
Pacific Gopher Snake (*Pituophis melanoleucus*)
Common Kingsnake (*Lampropeltis getula*)
FAMILY: VIPERIDAE (Vipers)
Western Rattlesnake (*Crotalus viridis*)

CLASS: AVES
ORDER: CICONIIFORMES (Herons, Storks, Ibises and Relatives)
FAMILY: ARDEIDAE (Bitterns, Herons, and Egrets)
Great Blue Heron (*Ardea herodi*as)
Great Egret (*Ardea alba*)
Snowy Egret (*Egretta thula*)
Cattle Egret (*Bubulcus ibis*)
FAMILY: CATHARTIDAE (New World Vultures)
Turkey Vulture (*Cathartes aura*)
ORDER: FALCONIFORMES (Vultures, Hawks, and Falcons)
FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)
Red-Tailed Hawk (*Buteo jamaicensis*)
Red-Shouldered Hawk (*Buteo lineatus*)
Sharp-Shinned Hawk (*Accipiter striatus*)
Swainson's Hawk (*Buteo swainsoni*)

FAMILY: FALCONIDAE (Caracaras and Falcons)
American Kestrel (*Falco sparverius*)
ORDER: CHARADRIIFORMES (Shorebirds, Gulls, and relatives)
FAMILY: CHARADRIIDAE (Plovers and relatives)
*Killdeer (*Charadrius vociferus*)
ORDER: COLUMBIFORMES (Pigeons and Doves)
FAMILY: COLUMBIDAE (Pigeons and Doves)
Rock Pigeon (*Columba livia*)
*Mourning Dove (*Zenaida macroura*)
Eurasian Collared Dove (*Streptopelia decaocto*)
ORDER: STRIGIFORMES (Owls)
FAMILY: TYTONIDAE (Barn Owls)
Barn Owl (*Tyto alba*)
FAMILY: STRIGIDAE (Typical Owls)
Great Horned Owl (*Bubo virginianus*)
ORDER: APODIFORMES (Swifts and Hummingbirds)
FAMILY: TROCHILIDAE (Hummingbirds)
Black-Chinned Hummingbird (*Archilochus alexandri*)
Anna's Hummingbird (*Calypte anna*)
ORDER: PASSERIFORMES (Perching Birds)
FAMILY: TYRANNIDAE (Tyrant Flycatchers)
*Black Phoebe (*Sayornis nigricans*)
*Say's Phoebe (*Sayornis saya*)
Western Kingbird (*Tyrannus verticalis*)
FAMILY: CORVIDAE (Jays, Magpies, and Crows)
California Scrub Jay (*Aphelocoma californica*)
*American Crow (*Corvus brachyrhynchos*)
Common Raven (*Corvus corax*)
FAMILY: ALAUDIDAE (Larks)
*Horned Lark (*Eremophila alpestris*)
FAMILY: HIRUNDINIDAE (Swallows)
Cliff Swallow (*Petrochelidon pyrrhonota*)
Barn Swallow (*Hirundo rustica*)
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
FAMILY: TROGLODYTIDAE (Wrens)
House Wren (*Troglodytes aedon*)
FAMILY: TURDIDAE (Thrushes)
Western Bluebird (*Sialia mexicana*)
American Robin (*Turdus migratorius*)
FAMILY: MIMIDAE (Mockingbirds and Thrashers)
*Northern Mockingbird (*Mimus polyglottos*)
FAMILY: PARULIDAE (Wood Warblers and Relatives)
Yellow-Rumped Warbler (*Dendroica coronata*)
FAMILY: STURNIDAE (Starlings and Allies)
*European Starling (*Sturnus vulgaris*)

FAMILY: MOTACILLIDAE (Wagtails and Pipits)
American Pipit (*Anthus rubrescens*)
FAMILY: EMBERIZIDAE (Emberizines)
*Savannah Sparrow (*Passerculus sandwichensis*)
*White-crowned Sparrow (*Zonotrichia leucophrys*)
Golden-crowned Sparrow (*Zonotrichia atricapilla*)
FAMILY: ICTERIDAE (Blackbirds, Orioles and Allies)
Red-winged Blackbird (*Agelaius phoeniceus*)
Tricolored Black Bird (*Agelaius tricolor*)
*Western Meadowlark (*Sturnella neglecta*)
*Brewer's Blackbird (*Euphagus cyanocephalus*)
Brown-headed Cowbird (*Molothrus ater*)
FAMILY: LANIIDAE (Shrikes)
*Loggerhead Shrike (*Lanius ludovicianus*)
FAMILY: FRINGILLIDAE (Finches)
House Finch (*Carpodacus mexicanus*)
Lesser Goldfinch (*Carduelis psaltria*)
FAMILY: PASSERIDAE (Old World Sparrows)
House Sparrow (*Passer domesticus*)

CLASS: MAMMALIA
ORDER: DIDELPHIMORPHIA (Marsupials)
FAMILY: DIDELPHIDAE (Opossums)
Virginia Opossum (*Didelphis virginiana*)
ORDER: INSECTIVORA (Shrews and Moles)
FAMILY: TALPIDAE (Moles)
Broad-footed Mole (*Scapanus latimanus*)
ORDER: CHIROPTERA (Bats)
FAMILY: VESPERTILIONIDAE (Vespertilionid Bats)
Yuma Myotis (*Myotis yumanensis*)
California Myotis (*Myotis californicus*)
Western Pipistrelle (*Pipistrellus hesperus*)
Big Brown Bat (*Eptesicus fuscus*)
Pale Big-eared Bat (*Corynorhinus townsendii pallescens*)
FAMILY: MOLOSSIDAE (Free-tailed Bat)
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)
ORDER: LAGOMORPHA (Rabbits, Hares, and Pikas)
FAMILY: LEPORIDAE (Rabbits and Hares)
*Black-Tailed Jackrabbit (*Lepus californicus*)
Desert Cottontail (*Sylvilagus audubonii*)
ORDER: RODENTIA (Rodents)
FAMILY: SCIURIDAE (Squirrels, Chipmunks, and Marmots)
*California Ground Squirrel (*Otospermophilus beecheyi*)
FAMILY: GEOMYIDAE (Pocket Gophers)
*Botta's Pocket Gopher (*Thomomys bottae*)
FAMILY: MURIDAE (Mice, Rats and Voles)

Western Harvest Mouse (*Reithrodontomys megalotis*)
Deer Mouse (*Peromyscus maniculatus*)
Norway Rat (*Rattus norvegicus*)
House Mouse (*Mus musculus*)
California Vole (*Microtus californicus*)

ORDER: CARNIVORA (Carnivores)

FAMILY: CANIDAE (Foxes, Wolves, and Relatives)

Coyote (*Canis latrans*)
Red Fox (*Vulpes vulpes*)
Gray Fox (*Urocyon cinereoargenteus*)

FAMILY: PROCYONIDAE (Raccoons and Relatives)

Raccoon (*Procyon lotor*)

FAMILY: MUSTELIDAE (Weasels and Relatives)

Striped Skunk (*Mephitis mephitis*)

APPENDIX C: SELECTED PHOTOGRAPHS OF THE PROJECT AREA

Photo 1 (above): Looking south at the western agricultural field and adjacent West Hills College campus along College Avenue. **Photo 2 (below):** One of the two tamarisk trees within the western agricultural field.

Photo 3 (above): Recently harvested fodder and weedy vegetation within the eastern agricultural field. **Photo 4 (below):** Dense ruderal vegetation along the southern margin of the western agricultural field and unpaved Pederson Avenue.

Photo 5 (above): Irrigation structures and utility line at the junction of Pederson Avenue and an unpaved road within the project area. **Photo 6 (below):** Pedestrian path and ornamental trees along Bush Street.

Photo 7 (above): One of several bird nests observed in the ornamental trees along the pedestrian path. **Photo 8 (below):** Existing basin adjacent to project area enclosed by a chainlink fence.

Photo 9: Small stand of broadleaf cattail within the existing basin (photo taken through fence).

APPENDIX D: U.S. FISH AND WILDLIFE SERVICE STANDARDIZED RECOMMENDATIONS FOR PROTECTION OF THE ENDANGERED SAN JOAQUIN KIT FOX PRIOR TO OR DURING GROUND DISTURBANCE

U.S. FISH AND WILDLIFE SERVICE
STANDARDIZED RECOMMENDATIONS
FOR PROTECTION OF THE ENDANGERED SAN JOAQUIN KIT FOX PRIOR TO OR DURING GROUND DISTURBANCE

Prepared by the Sacramento Fish and Wildlife Office
January 2011

INTRODUCTION

The following document includes many of the San Joaquin kit fox (*Vulpes macrotis mutica*) protection measures typically recommended by the U. S. Fish and Wildlife Service (Service), prior to and during ground disturbance activities. **However, incorporating relevant sections of these guidelines into the proposed project is not the only action required under the Endangered Species Act of 1973, as amended (Act) and does not preclude the need for section 7 consultation or a section 10 incidental take permit for the proposed project.** Project applicants should contact the Service in Sacramento to determine the full range of requirements that apply to your project; the address and telephone number are given at the end of this document. Implementation of the measures presented in this document may be necessary to avoid violating the provisions of the Act, including the prohibition against "take" (defined as killing, harming, or harassing a listed species, including actions that damage or destroy its habitat). These protection measures may also be required under the terms of a biological opinion pursuant to section 7 of the Act resulting in incidental take authorization (authorization), or an incidental take permit (permit) pursuant to section 10 of the Act. The specific measures implemented to protect kit fox for any given project shall be determined by the Service based upon the applicant's consultation with the Service.

The purpose of this document is to make information on kit fox protection strategies readily available and to help standardize the methods and definitions currently employed to achieve kit fox protection. The measures outlined in this document are subject to modification or revision at the discretion of the Service.

IS A PERMIT NECESSARY?

Certain acts need a permit from the Service which includes destruction of any known (occupied or unoccupied) or natal/pupping kit fox dens. Determination of the presence or absence of kit foxes and /or their dens should be made during the environmental review process. All surveys and monitoring described in this document must be conducted by a qualified biologist and these activities do not require a permit. A qualified biologist (biologist) means any person who has completed at least four years of university training in wildlife biology or a related science and/or has demonstrated field experience in the identification and life history of the San Joaquin kit fox. In addition, the biologist(s) must be able to identify coyote, red fox, gray fox, and kit fox tracks, and to have seen a kit fox in the wild, at a zoo, or as a museum mount. Resumes of biologists should be submitted to the Service for review and approval prior to an6y survey or monitoring work occurring.

SMALL PROJECTS

Small projects are considered to be those projects with small foot prints, of approximately one acre or less, such as an individual in-fill oil well, communication tower, or bridge repairs. These projects must stand alone and not be part of, or in any way connected to larger projects (i.e., bridge repair or improvement to serve a future urban development). The Service recommends that on these small projects, the biologist survey the proposed project boundary and a 200-foot area outside of the project footprint to identify habitat features and utilize this information as guidance to situate the project to minimize or avoid impacts. If habitat features cannot be completely avoided, then surveys should be conducted and the Service should be contacted for technical assistance to determine the extent of possible take.

Preconstruction/preactivity surveys shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any project activity likely to impact the San Joaquin kit fox. Kit foxes change dens four or five times during the summer months, and change natal dens one or two times per month (Morrell 1972). Surveys should identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, assess the potential impacts to the kit fox by the proposed activity. The status of all dens should be determined and mapped (see Survey Protocol). Written results of preconstruction/preactivity surveys must be received by the Service within five days after survey completion and prior to the start of ground disturbance and/or construction activities.

If a natal/pupping den is discovered within the project area or within 200-feet of the project boundary, the Service shall be immediately notified and under no circumstances should the den be disturbed or destroyed without prior authorization. If the preconstruction/preactivity survey reveals an active natal pupping or new information, the project applicant should contact the Service immediately to obtain the necessary take authorization/permit.

If the take authorization/permit has already been issued, then the biologist may proceed with den destruction within the project boundary, except natal/pupping den which may not be destroyed while occupied. A take authorization/permit is required to destroy these dens even after they are vacated. Protective exclusion zones can be placed around all known and potential dens which occur outside the project footprint (conversely, the project boundary can be demarcated, see den destruction section).

OTHER PROJECTS

It is likely that all other projects occurring within kit fox habitat will require a take authorization/permit from the Service. This determination would be made by the Service during the early evaluation process (see Survey Protocol). These other projects would include, but are not limited to: Linear projects; projects with large footprints such as urban development; and projects which in themselves may be small but have far reaching impacts (i.e., water storage or conveyance facilities that promote urban growth or agriculture, etc.).

The take authorization/permit issued by the Service may incorporate some or all of the protection measures presented in this document. The take authorization/permit may include measures specific to the needs of the project and those requirements supersede any requirements found in this document.

EXCLUSION ZONES

In order to avoid impacts, construction activities must avoid their dens. The configuration of exclusion zones around the kit fox dens should have a radius measured outward from the entrance or cluster of entrances due to the length of dens underground. The following distances are **minimums**, and if they cannot be followed the Service must be contacted. Adult and pup kit foxes are known to sometimes rest and play near the den entrance in the afternoon, but most above-ground activities begin near sunset and continue sporadically throughout the night. Den definitions are attached as Exhibit A.

Potential den**	50 feet
Atypical den**	50 feet
Known den*	100 feet
Natal/pupping den (occupied and unoccupied)	Service must be contacted

*Known den: To ensure protection, the exclusion zone should be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by kit foxes. Acceptable fencing includes untreated wood particle-board, silt fencing, orange construction fencing or other fencing as approved by the Service as long as it has openings for kit fox ingress/egress and keeps humans and equipment out. Exclusion zone fencing should be maintained until all construction related or operational disturbances have been terminated. At that time, all fencing shall be removed to avoid attracting subsequent attention to the dens.

**Potential and Atypical dens: Placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed.

Only essential vehicle operation on existing roads and foot traffic should be permitted. Otherwise, all construction, vehicle operation, material storage, or any other type of surface-disturbing activity should be prohibited or greatly restricted within the exclusion zones.

DESTRUCTION OF DENS

Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed. The value to kit foxes of potential, known, and natal/pupping dens differ and therefore, each den type needs a different level of protection. **Destruction of any known or natal/pupping kit fox den requires take authorization/permit from the Service.**

Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If at any point during excavation, a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped, without further disturbance, from the partially destroyed den.

Natal/pupping dens: Natal or pupping dens which are occupied will not be destroyed until the pups and adults have vacated and then only after consultation with the Service. Therefore, project activities at some den sites may have to be postponed.

Known Dens: Known dens occurring within the footprint of the activity must be monitored for three days with tracking medium or an infra-red beam camera to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use.

If kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den during its normal activity. Use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of the biologist. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant, for example during the animal's normal foraging activities. **The Service encourages hand excavation, but realizes that soil conditions may necessitate the use of excavating equipment. However, extreme caution must be exercised.**

Potential Dens: If a take authorization/permit has been obtained from the Service, den destruction may proceed without monitoring, unless other restrictions were issued with the take authorization/permit. If no take authorization/permit has been issued, then potential dens should be monitored as if they were known dens. If any den was considered to be a potential den, but is later determined during monitoring or destruction to be currently, or previously used by kit fox (e.g., if kit fox sign is found inside), then all construction activities shall cease and the Service shall be notified immediately.

CONSTRUCTION AND ON-GOING OPERATIONAL REQUIREMENTS

Habitat subject to permanent and temporary construction disturbances and other types of ongoing project-related disturbance activities should be minimized by adhering to the following activities. Project designs should limit or cluster permanent project features to the smallest area possible while still permitting achievement of project goals. To minimize temporary disturbances, all project-related vehicle traffic should be restricted to established roads, construction areas, and other designated areas. These areas should also be included in preconstruction surveys and, to the extent possible, should be established in locations disturbed by previous activities to prevent further impacts.

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

2. 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 should 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 should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the Service and the California Department of Fish and Game (CDFG) shall be contacted as noted under measure 13 referenced below.

3. 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 should 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 should not be moved until the Service has been consulted. If necessary, and under the direct supervision of the biologist, the pipe

may be moved only once to remove it from the path of construction activity, until the fox has escaped.

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

5. No firearms shall be allowed on the project site.

6. No pets, such as dogs or cats, should be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.

7. Use of rodenticides and herbicides in project areas should 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 should 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, as well as additional project-related restrictions deemed necessary by the Service. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped kit fox. The representative will be identified during the employee education program and their name and telephone number shall be provided to the Service.

9. An employee education program should be conducted for any project that has anticipated impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and/or agency personnel involved in the project. The program should include the following: A description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the previously referenced people and anyone else who may enter the project site.

10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is

disturbed during the project, but after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the Service, California Department of Fish and Game (CDFG), and revegetation experts.

11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for guidance.

12. Any contractor, employee, or military or agency personnel who are responsible for inadvertently killing or injuring a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916)445-0045. They will contact the local warden or Mr. Paul Hoffman, the wildlife biologist, at (530)934-9309. The Service should be contacted at the numbers below.

13. The Sacramento Fish and Wildlife Office and CDFG shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFG contact is Mr. Paul Hoffman at 1701 Nimbus Road, Suite A, Rancho Cordova, California 95670, (530) 934-9309.

14. New sightings of kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed should also be provided to the Service at the address below.

Any project-related information required by the Service or questions concerning the above conditions or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at:

Endangered Species Division
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846
(916) 414-6620 or (916) 414-6600

EXHIBIT "A" - DEFINITIONS

"Take" - Section 9 of the Endangered Species Act of 1973, as amended (Act) prohibits the "take" of any federally listed endangered species by any person (an individual, corporation, partnership, trust, association, etc.) subject to the jurisdiction of the United States. As defined in the Act, take means " . . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct". Thus, not only is a listed animal protected from activities such as hunting, but also from actions that damage or destroy its habitat.

"Dens" - San Joaquin kit fox dens may be located in areas of low, moderate, or steep topography. Den characteristics are listed below, however, the specific characteristics of individual dens may vary and occupied dens may lack some or all of these features. Therefore, caution must be exercised in determining the status of any den. Typical dens may include the following: (1) one or more entrances that are approximately 5 to 8 inches in diameter; (2) dirt berms adjacent to the entrances; (3) kit fox tracks, scat, or prey remains in the vicinity of the den; (4) matted vegetation adjacent to the den entrances; and (5) manmade features such as culverts, pipes, and canal banks.

"Known den" - Any existing natural den or manmade structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records, past or current radiotelemetry or spotlighting data, kit fox sign such as tracks, scat, and/or prey remains, or other reasonable proof that a given den is being or has been used by a kit fox. The Service discourages use of the terms "active" and "inactive" when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens often, with the result that the status of a given den may change frequently and abruptly.

"Potential Den" - Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is insufficient to conclude that it is being used or has been used by a kit fox. Potential dens shall include the following: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox use.

"Natal or Pupping Den" - Any den used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two, therefore, for purposes of this definition either term applies.

"Atypical Den" - Any manmade structure which has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

APPENDIX E: KINGS COUNTY GENERAL PLAN POLICIES

KINGS COUNTY GENERAL PLAN

Resource Conservation Element

Adopted by the Kings County Board of Supervisors

Originally on December 28, 1993

and amended as follows:

Amendment Number 1: April 12, 1994

Amendment Number 2: May 24, 1994

Amendment Number 3: November 29, 1994

Amendment Number 4: August 27, 1996

Amendment No. 5: July 29, 1997

Amendment No. 6: February 10, 1998

Originally Approved by the Kings County Planning Commission

on November 30, 1993, and subsequently for each of the amendments

Prepared by the Kings County Planning Department

I. INTRODUCTION

A. Purpose

Resource Conservation Element policies promote sustained economic health through long-term resource protection and cooperation between local agencies in attaining environmental objectives.

B. Consistency with Other Elements

The Resource Conservation Element is consistent with the Land Use and Open Space Elements in that all three seek to conserve and maintain the long-term productivity of natural resources.

C. Scope and Organization

The Resource Conservation Element addresses the conservation of water; air quality; soil and agricultural land; nonagricultural plant and wildlife communities; minerals and energy; and solid waste management, source reduction, and recycling.

The Resource Conservation Element does not address forests, fisheries, or geothermal energy since these resources are not present in Kings County.

II. WATER

The most important element for the economic survival of Kings County is the availability, beneficial use, and conservation of its water. A major portion of Kings County has been identified by the California Department of Water Resources as having a critical groundwater overdraft condition. Average rainfall in the area is ten inches per year, although drought conditions may further decrease this figure.

Approximately thirty-two percent of the 1.4 million acre feet of water used annually in Kings County for all purposes is obtained from groundwater. Groundwater is replenished from natural precipitation, stream and creek flows, imported water, and underground flows which vary annually depending on hydrologic conditions.

The "Natural Resource and Conservation" land use designation includes only that land which is environmentally sensitive due to the existence of natural watercourses, drainage basins, sloughs, vernal pools, alkali sinks, moist swales, springs, and other seasonal wetlands; or other natural lands containing water features. The designation provides permanent open space to protect these watercourses from the proliferation of growth, and thereby protect water quality. Its policies apply equally to lands under public and private ownership.

GOAL 11: Beneficially use, conserve, and protect water resources to assure an adequate long-term supply of water.

Objective 11.1: Avoid the placement of potential pollution sources in areas that have the potential to foster groundwater recharge.

Policy 11a: Cooperate with local agencies in the preservation and purchase of natural sloughs for use as water recharge and drainage basins.

Objective 11.2: Protect groundwater quality by applying development standards which seek to prevent pollution of surface or groundwater and net loss of natural water features.

Policy 11b: Require subdivisions to connect to the sewer and water services of a city or community services district.

Policy 11c: Support measures to ensure that water users do not unreasonably use groundwater resources.

Policy 11d: Protect groundwater by requiring the installation of wells in conformity with the California Water Code, the Kings County Well Ordinance, and other pertinent state and local requirements.

Policy 11e: Work with other municipalities to acquire surface water as mitigation and offset for future urban growth.

GOAL 12: Protect the Kings River.

Objective 12.1: Maintain the existing Kings River water conveyance system and its use as a designated floodway; encourage the preservation of riparian habitat along the Kings River consistent with state and federally mandated flood control purposes.

Policy 12a: Classify the Kings River channel as a designated floodway pursuant to its adoption as such by the State Reclamation Board in 1971. Recognize the Kings River Conservation District's responsibility to maintain the Kings River channels and levees for flood control purposes. On land within the floodway, allow farming and other uses that are consistent with the designated floodway regulations of the State Reclamation Board.

Policy 12b: Apply the "Natural Resource and Conservation" land use designation along the Kings River and in environmentally sensitive areas having existing natural watercourses, drainage basins, sloughs, or other natural water features. The only permitted uses on land so designated include uses such as flood control channels, water pumping stations, irrigation ditches, water recharge basins, limited open public recreational uses such as passive riverside parks, related incidental structures, and agricultural crop and livestock production that does not include permanent structures. The application of this designation shall be subject to administration of the encroachment permit process by the Kings River Conservation District for areas along the Kings River designated floodway.

IV. SOIL

Soil resource policies, intended to maintain agricultural productivity, are administered largely by Resource Conservation Districts (RCD's) rather than by the County.

A. Conservation of Land with Soil Suitable for Agriculture

Important farmland soils are located throughout Kings County, primarily on the San Joaquin Valley floor. Soil, climate, topography, and water availability combine to make Kings County a highly productive agricultural area. However, good agricultural land is often desirable for building sites since it is generally flat with few physical constraints, and is often located near existing expanding communities.

GOAL 14: Encourage the conservation of soil resources to protect their longterm agricultural productivity.

Objective 14.1: Conserve prime agricultural soils; avoid their conversion to nonagricultural use.

Policy 14a: Apply one of the three Agriculture land use designations to areas with productive and potentially productive agricultural soils and grazing land.

B. Preservation of Soil

Much of the irrigated land in the San Joaquin Valley is affected by salt, although the amount and type of salts varies depending on the type of soil and the amount of irrigation water used. The presence of salt in soil decreases the availability of water to a plant. Some plants can tolerate more salts than others. A knowledge of salt-tolerant plants is useful to match crops with growing conditions. Leaching is probably the best method used to control salt. Other methods include crop rotation, subsurface drains, and soil amendments.

Wind erosion is a problem on the west side of the Central Valley. Loss of topsoil as dust blown into the air contributes to the loss of crops, damage to the public health including the dissemination of spores causing Valley fever, automobile accidents, and damage to public facilities. Most wind erosion occurs between March and June. Soil can be protected from wind erosion by maintaining adequate growing vegetation, depositing crop residues to cover the soil, and maintaining adequate soil moisture from irrigation and tillage to keep the soil stable.

Goal 15: Encourage soil conservation and management practices that maintain the productivity of the soil.

Objective 15.1: Ensure that land use decisions are compatible with the control of soil erosion and the maintenance of soil quality.

Policy 15a: Require erosion control measures for any development involving construction or grading near waterways, or on land with slopes over 10 percent. Require that improvements such as roads and driveways be designed to retain natural vegetation and topography to the extent feasible.

V. NATURAL PLANT AND ANIMAL COMMUNITIES

A. Natural Plant and Animal Habitats

Natural habitat areas provide food and cover for wildlife species and are a vital part of the basic conservation principle. Birds, mammals, fish, reptiles, amphibians, and invertebrates depend upon favorable natural habitat for their survival.

The California Department of Fish and Game is a state trustee agency charged with managing and protecting fish and wildlife species and habitats, and sensitive plant and animal species which are protected by state and federal law. Projects which result in adverse impacts to listed species must obtain a Fish and Game management permit. Mitigation measures may be required to reduce project impacts on sensitive plants, animals, and habitats. More detailed information pertaining to Kings County is contained in the report, "Biological Resources Survey," summarized in Appendix 3 and incorporated in full herein by reference.

GOAL 16: Preserve land that contains important natural plant and animal habitats.

Objective 16.1: Require that development in or adjacent to important natural plant and animal habitats be consistent with the preservation of that habitat.

Policy 16a: Require development to locate on sites adjacent to previously developed areas. Require development in areas containing sensitive natural wildlife habitats or relatively undisturbed natural habitat to be developed consistent with state and federal guidelines.

Policy 16b: Prevent the net degradation of natural plant and wildlife habitat as required by state and federal law.

Policy 16c: If new development or other actions are likely to result in incidental take of any threatened or endangered animal species, require project applicants to consult with the California Department of Fish and Game and the United States Fish and Wildlife Service and to obtain appropriate authority for such take pursuant to Endangered Species Act requirements.

Policy 16d: Require developers to mitigate unavoidable significant adverse impacts on rare and endangered species and their habitat. Mitigation could include habitat improvement or protection, acquisition of other habitat, or payment to an appropriate agency to purchase, improve, or protect such habitat.

Policy 16e: Use Appendix 3 to the General Plan for guidance as to specific steps to be followed relating to the mitigation of impacts on wildlife habitat. Under these procedures development projects are required to work with the California Department of Fish and Game and the United States Fish and Wildlife Service to mitigate potential impacts to wildlife habitat.

1. Wetlands

Wetlands, or areas saturated with moisture such as freshwater marshes and vernal pools, provide habitat for many plant and animal species and serve as the base of a food chain which supports numerous types of fish, birds, and mammals. Loss of wetlands destroys wildlife and decreases hunting, fishing, and recreational opportunities. If current reclamation and drainage practices continue, then the federal and state goal of preserving them may not be met.

GOAL 17: Maintain the quality of natural wetland areas identified by the California Department of Fish and Game and the United States Fish and Wildlife Service.

Objective 17.1: Maintain compatible land uses in natural wetland habitats designated by state and federal agencies.

Policy 17a: Follow state and federal guidelines for the protection of natural wetlands. Require developers to obtain authorization from the appropriate local, state, or federal agency prior to commencement of any wetland fill activities.

Policy 17b: Use the California Environmental Quality Act (CEQA) process to assess wetland resources; require mitigation measures for development which could adversely impact a designated wetland.

Policy 17c: Exempt prior converted wetlands from consideration as wetlands under the County planning process, except as required by state and federal regulations.

2. Riparian Environments

Areas along natural streams, or adjacent to other natural bodies of water, may be referred to as riparian environments. These areas offer wildlife a rich source of insect and plant food, shelter and nesting sites, and water. The plant cover regulates water temperature and provides a nursery habitat for fish.

The riparian environment is especially vulnerable to fluctuations in the water supply. Practices which control water flow or waterway vegetation can change the riparian environment while attaining essential water delivery and flood control functions for the public good.

Plants and trees serve as filters for sediment and pesticides, stabilize banks, and keep soils loose and permeable, allowing aquifers below streams to be recharged. Elimination of natural plant communities along streams can increase surface runoff and siltation, creating a stream environment detrimental to fish.

GOAL 18 : Protect and manage riparian environments as valuable resources.

Objective 18.1: Ensure that, in development decisions affecting riparian environments, the conservation of fish and wildlife habitat and the protection of scenic qualities are balanced with other purposes representing basic health, safety, and economic needs.

Policy 18a: Designate the Kings River as a resource conservation area, implemented by use of the Natural Resource and Conservation zone district.

Policy 18b: Encourage the Kings River Conservation District to avoid substantial alteration of the Kings River channel and its riparian vegetation, consistent with their flood control responsibilities.

Policy 18c: Evaluate the potential impact on the riparian environment of proposed development adjacent to the Kings River, beyond the boundaries of the designated floodway. Conservation of fish and wildlife habitat and protection of scenic qualities should be the guiding principle.

Policy 18d: Prohibit development within riparian environments over which the County has jurisdiction. However, allow or consider for approval if it is determined that significant disturbance of the riparian environment would not occur, the following passive uses or activities:

Streamside maintenance for mandated flood control or water delivery purposes;

Road and utility line crossings;

Grazing and similar agricultural production activities not involving structures or cultivation;

Vegetation removal for integrated pest management programs under guidelines Passive recreational uses such as riverside parks and bikeways

Policy 18e: Refer all discretionary permit applications for projects along the Kings River and Cross Creek to the appropriate local, state, and federal agencies for review and approval.

B. Threatened and Endangered Species

Plants help reduce surface runoff, retain soils and maintain streambanks, provide wildlife habitat, and maintain a healthy and diverse physical environment.

Conversion of land to urban use can seriously disturb native vegetation, force wildlife onto marginal lands, introduce non-native plant species, and in some cases prevent necessary natural wildfires.

Many plants and animals in danger of extinction due to the loss or alteration of their habitat are protected by state and federal law. These threatened and endangered plant and animal species frequently provide essential links in the natural ecosystem.

Goal 19: Balance the protection of the County's diverse plant and animal communities with the County's economic needs.

Objective 19.1: Require mitigation measures to protect important plant and wildlife habitats.

Policy 19a: In the initial project review for development permits, complete the inquiry process outlined in Appendix 3 to determine whether the project is likely to have a significant adverse impact on any threatened or endangered species habitat locations, and to assure appropriate consideration of habitat preservation by development. Maintain current copies of California Department of Fish and Game and United States Fish and Wildlife Service maps showing locations of known threatened and endangered species habitat. If shown to be necessary, require the developer to consult with the California Department of Fish and Game, the United States Fish and Wildlife Service, and the United States Army Corps of Engineers as to potential impacts, appropriate mitigation measures, and required permits.

Policy 19b: Require as a primary objective in the review of development projects the preservation of healthy native oaks and other healthy native trees.

Policy 19c: Maintain to the maximum extent practicable the natural plant communities utilized as habitat by threatened and endangered species (see Appendix 3 for a listing and map of these plant communities).

C. Freshwater Recreational Fishing

Recreational fishing in Kings County occurs primarily along the banks of the Kings River, which is administered by the State Reclamation Board, and at three County-maintained locations along the California Aqueduct, near Kettleman City, and near the Avenal Cutoff (see the Open Space Element, Figure 14, for locations).

Agriculture, water diversion, and land development impact the Kings River and the California Aqueduct and can reduce recreational fishing resources. Sedimentation, loss of riparian vegetation, and streambank erosion can also damage recreational fishing habitat.

GOAL 20: Manage natural stream environments to provide protection for fish habitat.

Objective 20.1: Protect freshwater recreational fishing along the Kings River and the California Aqueduct by balancing agricultural and development needs with the protection of these resources.

Policy 20a: Encourage design of public and private projects which will minimize damage to the Kings River.

Ara Chekerdemian

From: do_not_reply@fresno.gov
Sent: Friday, February 21, 2020 10:33 AM
To: Ara Chekerdemian
Subject: Your application P20-00492 has a status update

** External email from: do_not_reply@fresno.gov. If suspicious, forward to: NotifySecurity@lennar.com **

Your application P20-00492 has been updated.

Review : County PW and Planning
Status : Final Review
Comments : The City of Fresno will be requiring a Traffic Impact Study. Please include County in routing.
Parcel # : 50506007
Description : The proposed TTM No. 6294 consists of 185 single family lots plus a park site and to be a Planned Development. The site consists of 1 parcel (APN 505-060-07) and is located at the south east corner of North Grantland Ave. just south of West Barstow Ave.. Current zoning for this parcel is RMX and would be rezoned to RS-5. The proposed community is 29.84 acres. The existing jurisdiction is City of Fresno.
Planner : Chris Lang
Planner Email : Chris.Lang@fresno.gov
Reviewer : County Planning
Reviewer Email : bspaunhurst@FresnoCountyCa.gov

APPENDIX C

CULTURAL RESOURCE INVENTORY

Cultural Resource Inventory for Lennar Tract 848 in the City of Lemoore, Kings County, California

Diana T. Dyste and Randy Ottenhoff

Prepared By

Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

Prepared For
Lennar Central Valley
8080 N. Palm Ave., Suite 110
Fresno, CA 93711

November 2019
draft

USGS Lemoore, CA 7.5-minute quadrangle
93.10 acres intensive pedestrian survey
Keywords: Negative findings

MANAGEMENT SUMMARY

Applied EarthWorks, Inc. (Æ) performed a cultural resource investigation of the 93.10-acre Lennar Tract 848 Project (Project) west of State Route 41 and east of West Hills College in the city of Lemoore, Kings County, California. The Project requires California Environmental Quality Act (CEQA) environmental review, which mandates that public agencies determine whether a proposed project will cause a significant change to the environment, including cultural resources, and if so, whether impacts can be avoided or mitigated.

To fulfill the CEQA requirements, and on behalf of Lennar Central Valley, Æ completed: (1) a records search at the California Historical Resource Information System Southern San Joaquin Valley Information Center (SSJVIC); (2) desktop archival research; (3) nongovernmental Native American outreach; and (4) a pedestrian survey of the 93.10-acre Project area. The records searches conducted by the SSJVIC and Native American Heritage Commission did not identify any previously recorded cultural resources within the Project area; however, the Santa Rosa Rancheria Tachi-Yokut Tribe expressed concern about the potential for buried archaeological sites within or near the Project area. Similarly, a review of aerial photographs and historical maps did not indicate any historic-era resources present within the study area. An 1869 General Land Office survey plat suggests the Project area is within a floodwater basin of the South Fork Kings River. Æ's archaeological pedestrian survey of the Project area did not identify any cultural resources on the ground surface within the Project area.

Consistent with state and federal statutes, Æ advises that in the event archaeological remains are encountered during Project development or ground-disturbing activities in the Project area, all work within 50 feet of the find should be halted until a qualified archaeologist can identify the discovery and assess its significance. In addition, if human remains are uncovered during construction, the Kings County Coroner is to be notified to arrange their proper treatment and disposition. If the remains are identified on the basis of archaeological context, age, cultural associations, or biological traits to be those of a Native American, California Health and Safety Code 7050.5 requires that the county coroner notify the NAHC within 24 hours of discovery. The NAHC will then identify the Most Likely Descendent, who will be afforded the opportunity to recommend means for treatment of the human remains following protocols in California Public Resources Code (PRC) 5097.98.

Field notes and photographs for this Project are on file at Æ's office in Fresno, California. A copy of this report will be transmitted to the SSJVIC at California State University, Bakersfield, for inclusion in the California Historical Resources Information System database.

CONTENTS

APPENDICES

FIGURES

1
INTRODUCTION

Applied EarthWorks, Inc. (Æ) performed a cultural resource inventory for the proposed 93.10-acre Lennar Tract 848 Project (Project). The Project is west of State Route 41 and east of West Hills College in the city of Lemoore, Kings County, California (Figure 1-1). Specifically, the Project lies in Sections 8 and 9, Township 19 South, Range 20 East, as shown on the U.S. Geological Survey Lemoore, CA, 7.5-minute topographic quadrangle (Figure 1-2). The Project would involve grading to achieve level ground surface, soil compaction, and ground disturbance related to vegetation grubbing and excavation for installation of sewer, water, and electrical lines as well as housing pads. As part of the Lennar Central Valley's application for residential development, the City of Lemoore (City) requires the identification of cultural resources (i.e., archaeological site or built-environment properties that are 50 years or older) within the proposed Project area (Figure 1-3).

The Project is subject to the California Environmental Quality Act (CEQA) statute (California Public Resources Code [PRC] Sections 21000–21189) and 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 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 (CRHR); (2) included in a local register of historical resources (pursuant to PRC Section 5020.1[k]) or identified as a significant historical resource 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 historic-era archaeological sites, structures, buildings, and objects (14 CCR 15064.5[a][3] and 15064.5[c]).

To assist Lennar in fulfilling CEQA requirements, Æ conducted a cultural resource investigation that included: (1) a records search at the California Historical Resources Information System's (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) at California State University, Bakersfield, to identify reports and cultural resources previously recorded in the Project area and surrounding 0.5-mile area; (2) desktop archival research to better understand historical patterns of land use in the Project area; (3) a search of the Native American Heritage Commission's (NAHC) Sacred Lands File and nongovernmental outreach to local tribes and individuals to ascertain the presence of sacred sites or areas of concern to tribes; and (4) a pedestrian survey of the Project area. The results of these efforts are presented herein.

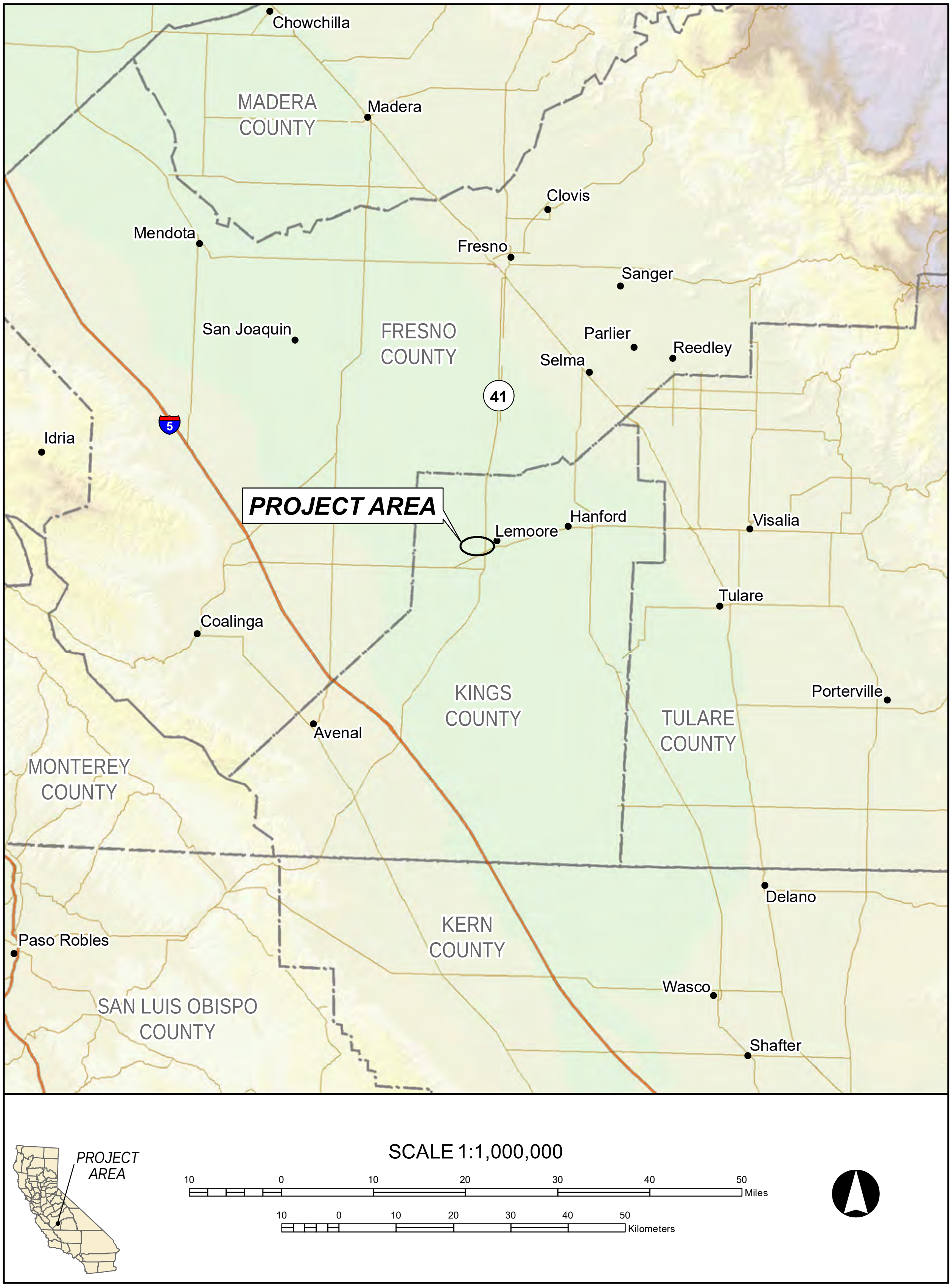

Figure 1-1 Project vicinity in Kings County, California.

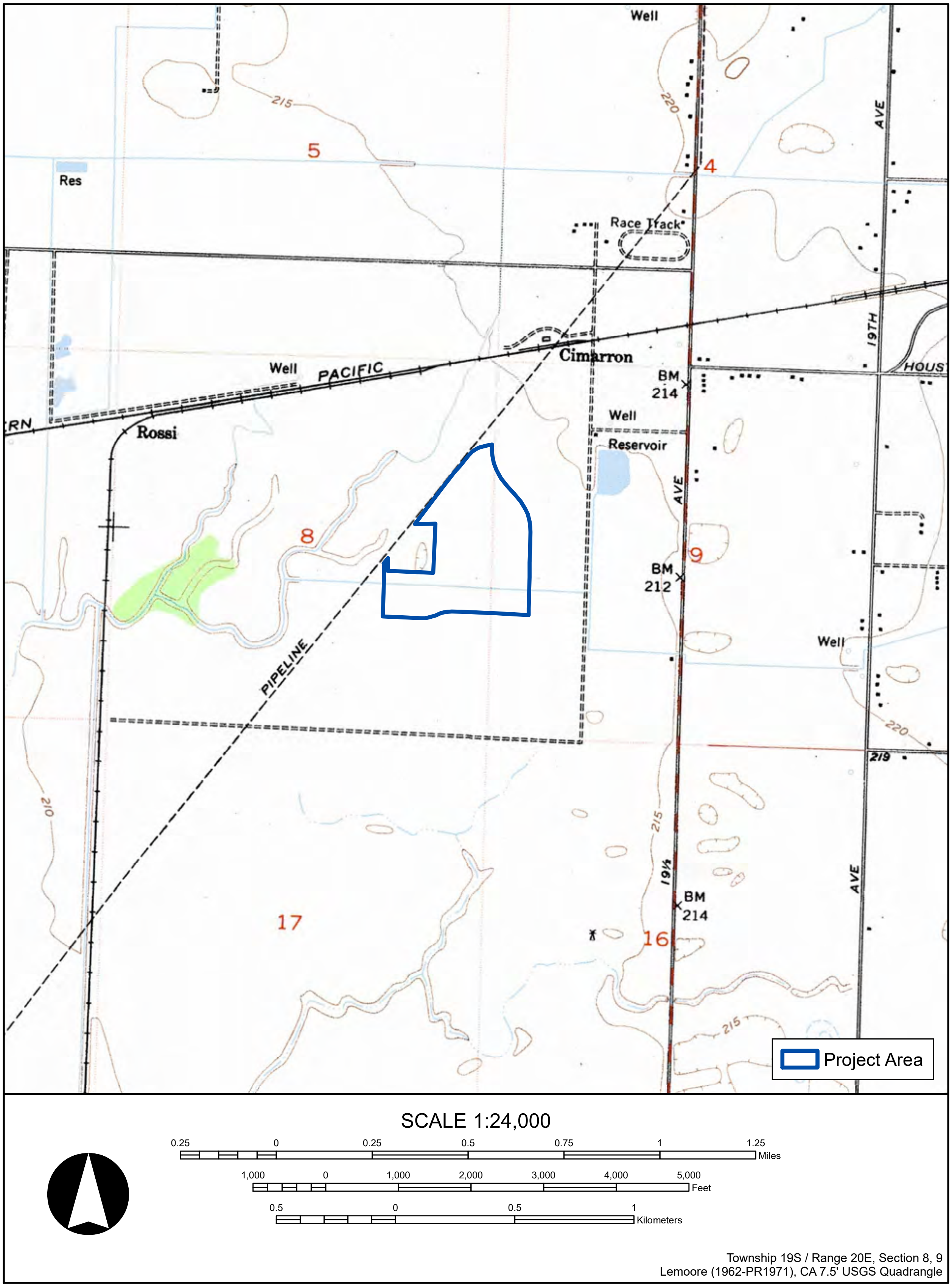

Figure 1-2 **Project location on the USGS Lemoore, CA, 7.5-minute topographic quadrangle.**

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 1-3 Aerial view of the Project area in western Lemoore.

Æ Senior Archaeologist and Project Manager Diana T. Dyste prepared this report. Dyste holds a master's degree in archaeology from the University of California, Santa Barbara, and is a Registered Professional Archaeologist (RPA 39362477). Staff Archaeologists Randy Ottenhoff was co-author of this report, and Ward Stanley served as Field Supervisor. GIS Technician Flavio Silva assisted with fieldwork and prepared report figures and images.

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:Figure 12-9). 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.

The San Joaquin and Kings rivers are the dominant hydrological features in the San Joaquin Valley. Streams flowing from the main rivers are seasonal and remain dry for most of the year. However, before historic drainage projects and modern reclamation, seasonal flooding from the San Joaquin and Kings rivers 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, which was south of the study vicinity and spanned as much as 30 miles from shore to shore (Preston 1981).

The abundance of water provided a rich habitat for plants and animals. Common native plants would have included white, blue, and live oaks (*Quercus* spp.) as well as walnut (*Juglans* sp.), cottonwood (*Populus fremontii*), willow (*Salix* sp.), and tule (*Schoenoplectus* sp.), especially hardstem bulrush (*Scirpus acutus*). Also prominent is cattail (*Typha* sp.) and various grasses, forbs, and sedges. 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 materials 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 San Joaquin and Kings rivers, 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 up to 10 meters along the lower stretches of the San Joaquin Valley drainage systems (Meyer et al. 2010; Onken 2019). 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 central 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).

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 appear 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, 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). The Tachi Yokuts village *Wiu* (also Waiu, or Mussel Slough) was just south of Lemoore at the present location of the Santa Rosa Rancheria Tachi-Yokut reservation, which is a few miles southeast of the Project area (Kroeber 1976:484). During the historic era, the general vicinity of Lemoore was a seasonal plant and seed collection area for local tribes. The Tachi 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 Yokuts diet.

Intensive European exploration of Yokuts territory did not take place until the early nineteenth century (Wallace 1978). As a result of European contact with Native American populations of the San Joaquin Valley, indigenous populations were significantly reduced by disease and settlement patterns were disrupted as a result of recruitment for Missions Soledad, San Luis Obispo, San Antonio de Padua, and San Juan Bautista. However, even more 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. By 1850, of the estimated 15,700 people constituting the 15 tribelets of the Southern Valley Yokuts, approximately 3,680 are estimated to have survived into the mid-twentieth century (Cook 1955).

Many Southern Valley Yokuts tribes have survived the effects of colonization, particularly the Santa Rosa Rancheria Tachi Yokut Tribe who have since developed an early childhood education to college success program and have 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 a Tribal Council and operates auxiliary departments that serve local tribal 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, and other community welfare 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 study to the Project area 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 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 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, the industry's growth accelerated as many successful prospectors and businessmen reinvested their profits from the gold rush in cattle and sheep herds. Joseph P. Lane parlayed the earnings from his Stockton liquor business in the 1850s to become one of the state's most prominent stockmen. His family settled in southern Kings County in 1870 and acquired over 7,000 acres of San Joaquin River terrace near what is now known as Lanes Bridge (Guinn 1905:1262–1263). 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.

By the early 1870s, however, 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.

Lemoore was founded by Dr. Lovern Lee Moore, who moved his family to the vicinity of Tulare Lake in 1871. Moore surveyed and sold lots to the north of the lake to form the nucleus of the town. As the lake retreated during the late nineteenth century, land became available, allowing further settlement of the area (Menefee and Dodge 1913). Moore petitioned for a post office in 1873 with the name “La Tache,” but the post office opened in 1875 as Lemoore abbreviated from the applicant’s middle and last name “Lee Moore” (Wright and Cox-Finney 2010:21). An elementary school was opened in December 1873 (Wright and Cox-Finney 2010:91). Finally, the railroad came through in 1877, fully connecting Lemoore to the rest of California. The City of Lemoore was incorporated in 1900 (Wright and Cox-Finney 2010). By 1913, the city had numerous churches, multiple schools, and a thriving business community centered around agriculture and the supply of materials and equipment to farms (Menefee and Dodge 1913). Today, agriculture remains an important industry in Lemoore, although Naval Air Station Lemoore, which was established in 1961, has provided substantial employment opportunities and fostered further development in the area (Wright and Cox-Finney 2010:109).

3
METHODS

3.1 RECORDS SEARCH

On September 27, 2019, 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 also 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:

- The Map Aerial Locator Tool (MALT) (http://malt.library.fresnostate.edu/MALT/);
- United States Geological Survey TopoView (https://ngmdb.usgs.gov/topoview);
- General Land Office survey plat of 1869 (https://glorecords.blm.gov/default.aspx);
- Æ's in-house library, which includes maps and local histories.

3.3 NATIVE AMERICAN OUTREACH

On September 27, 2019, 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 October 2, 2019, with its findings and attached a list of Native American tribes and individuals culturally affiliated with the Project area. On October 17, 2019, 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 Assembly Bill 52 government-to-government consultation.

3.4 ARCHAEOLOGICAL SURVEY

On October 9 and 10, 2019, Æ Staff Archaeologists Ward Stanley and Flavio Silva conducted an intensive archaeological pedestrian survey of the entire Project area. They completed the survey using parallel zigzag transects spaced 15–20 meters apart and took photographs of the area using an Olympus TG-860 digital camera. Methods and observations were recorded on Æ Daily Work

Record and Survey Field Record forms. They 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.

4
FINDINGS

4.1 RECORDS SEARCH RESULTS

The SSJVIC provided results of the records search in a letter dated October 7, 2019. The response included an inventory of previous studies conducted within the Project area and surrounding 0.5-mile area (Records Search File No. 19-386). The search reported no previously recorded cultural resources in the Project area and only one resource, a segment of the historic Southern Pacific Railroad (P-16-00122) within 0.5-mile of the Project area. There has been one previous cultural resource study within the Project area (KI-00191), which was completed in 2002 with negative findings. Seven additional surveys have occurred within 0.5-mile of the Project area (Appendix B).

4.2 ARCHIVAL RESEARCH

The archival research conducted for the Project area did not identify any potential historic-era resources in the Project area, although several historic-era structures were noted in the surrounding 0.5-mile area. Review of the GLO land plats, Metsker's map, and historic-era USGS topographic quadrangles suggests the area was marshy and seasonally inundated with floodwaters of the South Fork Kings River. Additional details related to archival resources are included in Appendix B.

4.3 NATIVE AMERICAN OUTREACH

The NAHC responded to Æ's request on October 2, 2019, with negative findings for the Sacred Lands File search of the Project 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 and recommended outreach to local tribes. A list of representatives of five tribes was provided by the NAHC:

- Stan Alec of the Kings River Choinumni Tribe;
- Chairperson Rueben Barrios Sr. of the Santa Rosa Rancheria Tachi-Yokut Tribe;
- Chairperson Leanne Walker-Grant of Table Mountain Rancheria;
- Cultural Resources Director Robert Pennell of Table Mountain Rancheria;
- Chairperson Kenneth Woodrow of the Wuksache Indian Tribe/Eshom Valley Band; and
- Chairperson Neil Peyron of the Tule River Indian Tribe.

On October 31, 2019, Æ sent a letter to each of these tribal contacts, providing information about the Project and inviting interested tribal representatives to contact Æ with information or questions. Æ made follow-up phone calls on November 12, 2019, to those contacts with an active telephone number. The Cultural Director of the Santa Rosa Rancheria Tachi-Yokut Tribe expressed concern about the presence of archaeological sites potentially in or near the Project area and surrounding vicinity. The Table Mountain Rancheria stated the Project area fell outside their area of interest, while the Kings River Choinumni Tribe stated there were no areas of concern within the Project area. No additional responses from Native American contacts have been received to date. A record of correspondence is included in Appendix C.

4.4 ARCHAEOLOGICAL SURVEY FINDINGS

4.4.1 Visibility

The Project area is primarily utilized for crop cultivation and, as a result, is relatively flat and unobscured by pavement or buildings. A 7.62-acre solar farm lies directly adjacent and is not part of the current Project. As such, this fenced-off area was not included in the survey. Ground visibility varied within the Project area. Fallow fields and dirt roadways provided the best visibility (90–100 percent ground surface visible; Figure 4-1). Dense stands of wheat and tomatillos on the east side of the Project area reduced ground visibility to between 5 and 30 percent (Figures 4-2 and 4-3).

4.4.2 Negative Findings

Æ archaeologists surveyed the entire 93.10-acre Project area (see Figure 1-3) and found no evidence of prehistoric or historic-era archaeological sites, features, or isolated artifacts on the ground surface. No historic-era built environment resources were identified in the Project area.

Figure 4-1 Overview of fallow fields with excellent visibility, facing north.

Figure 4-2 **Dense vegetation limiting ground visibility in the eastern Project area, facing north.**

Figure 4-3 **Dense vegetation in agricultural fields, facing west.**

5

CONCLUSIONS AND RECOMMENDATIONS

Lennar Central Valley plans to construct Tract 848, a residential development on 93.10 acres of agricultural property. The Project area is west of State Route 41 and east of West Hills College in the City of Lemoore, Kings County, California. The Project would involve grading to achieve level ground surface, soil compaction, and ground disturbance related to vegetation grubbing, creation of housing pads, and excavation during installation of utilities.

As a consultant to Lennar Central Valley, Æ performed background research, obtained a records search from the SSJVIC of the CHRIS, reviewed the results of a search of the NAHC Sacred Lands File, contacted local tribal representatives, and conducted an intensive pedestrian survey of the Project area. Æ's pedestrian survey did not identify archaeological or built environmental cultural resources within the Project area.

In general, the area in and surrounding Lemoore, California, is considered highly sensitive for buried archaeological deposits. Therefore, consistent with state statutes, Æ advises that in the event archaeological remains are encountered during Project development or ground-disturbing activities in the Project area, all work within 50 feet of the find should be halted until a qualified archaeologist can identify the discovery and assess its significance. In addition, if human remains are uncovered during construction, the Kings County Coroner is to be notified to arrange their proper treatment and disposition. If the remains are identified on the basis of archaeological context, age, cultural associations, or biological traits to be those of a Native American, California Health and Safety Code 7050.5 requires that the county coroner notify the NAHC within 24 hours of discovery. The NAHC will then identify the Most Likely Descendent, who will be afforded the opportunity to recommend means for treatment of the human remains following protocols in California Public Resources Code (PRC) 5097.98

6
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APPENDIX A

Personnel Qualifications

DIANA TERESA DYSTE

Senior Archaeologist

Areas of Expertise

- Cultural resource management
- Ethnography
- Tribal consultation
- Zooarchaeological, paleoethnobotanical, and lithics analysis

Years of Experience

- 19

Education

Ph.D., Anthropology/Feminist Studies, University of California, Santa Barbara, 2018

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

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 19 years of experience in cultural resources management and meets the Secretary of the Interior's qualification criteria as an archaeologist and ethnographer. 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, Esselen, 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.

RANDY L. OTTENHOFF

Associate Archaeologist

Areas of Expertise

- Cultural resource management
- Federal and California/Nevada regulations
- Design and implementation of pedestrian survey and subsurface site testing
- Rock art recordation and analysis
- Spatial analysis

Years of Experience

- 15

Education

Ph.D., Archaeology, University of Central Lancashire, 2015

B.A., Anthropology, University of California, Davis, 2004

A.A., Liberal Arts, American River College, Sacramento, 2001

Registrations/Certifications

- Registered Professional Archaeologist 17098
- Permitted Oregon Qualified Archaeologist

Professional Affiliations

- Society for American Archaeology
- Society for California Archaeology

Professional Experience

2018–	Associate Archaeologist, Applied EarthWorks, Inc., Fresno, California
2017–2018	Cultural Resource Specialist II, ICF, Sacramento, California
2016–2017	Cultural Resource Specialist II, HDR Engineering, Inc., Sacramento, California
2010	Field Technician, Chambers Group, LLC, Reno, Nevada
2007–2010	Field Archaeologist, Pacific Legacy, Sacramento, California
2007–2009	Staff Archaeologist, Abercrombie's Archaeology Consultants, Reno, Nevada
2006	Field Technician, ASM Affiliates, Reno, Nevada
2004–2007	Field Archaeologist, Kautz Environmental, Reno, Nevada

Technical Qualifications

Dr. Ottenhoff has 15 years of experience in cultural resources management and meets the Secretary of the Interior's qualification criteria as an archaeologist. He has extensive experience managing field projects pursuant to applicable federal, state, and local regulations for projects in the Sierra Nevada, including projects with historic-period artifact scatters and mines as well as prehistoric sites. Dr. Ottenhoff has served as sole and co-author of numerous technical reports, including Class/Phase I Inventory and Class III federal reports as well as letter reports summarizing the methods and results of project monitoring. He is familiar with 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; and design and implementation of cultural resources plans. He is qualified to conduct archaeological survey, including the supervision of small to medium-sized field crews, as well as field and laboratory processing of artifact assemblages. Dr. Ottenhoff has project experience in coastal, highlands, grasslands, desert, and remote mountain settings across the state of California and is certified to conduct archaeological investigations in Oregon.

CONFIDENTIAL APPENDIX*
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APPENDIX B

Record Search Results

*Archaeological site location information is exempt from the Freedom of Information Act (FOIA) and California Public Records Act (CPRA).

California
Historical
Resources
Information
System

Fresno
Kern
Kings
Madera
Tulare

Southern San Joaquin Valley Information Center
California State University, Bakersfield
Mail Stop: 72 DOB
9001 Stockdale Highway
Bakersfield, California 93311-1022
(661) 654-2289
E-mail: ssjvic@csub.edu
Website: www.csub.edu/ssjvic

10/7/2019

Diana Dyste
Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

Re: Lennar – Tract 848
Records Search File No.: 19-386

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on the Lemoore 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:	None
Resources within 0.5 mile radius:	P-16-000122
Reports within project area:	KI-00191
Reports within 0.5 mile radius:	KI-00019, 00028, 00037, 00110, 00111, 00119, 00140

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

OHP Historic Properties 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.glorecords.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: 2019.10.07 12:45:50 -07'00'

Celeste M. Thomson
Coordinator

Resource List

SSJVIC Record Search 19-386

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
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); 2013 (A. Gardner, L. Bennett, S. Lewis, Far Western Anthropological Research Group, Inc.); 2017 (Jessica Jones, Applied EarthWorks, Inc.)	KI-00109, KI-00245, KI-00310

Report List

SSJVIC Record Search 19-386

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
KI-00019	NADB-R - 1141360	1992	Kus, James S.	Historic Property Survey Report 6-Kin-41 39.4/42.0 293500 for the Construction of a Four Lane Expressway in Lemoore	California Department of Transportation, District 06, Environmental Branch	
KI-00019A		1991	Kus, James S. and Mader, Claudia A.	Negative Archaeological Survey Report for 6-Kin-41 39.4/42.0 293500	California Department of Transportation	
KI-00019B		1992	Clement, Dorene	Historical Architectural Survey Report for New Alignment for Route 41 Lemoore, Kings County 06-Kin-41, P.M.39.4/42.0 06-293500	California Department of Transportation, District 6, Environmental Analysis Branch	
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-00037	Caltrans - DPD-EP-25 (REV. 2/83)	1992	Kus, James S. and Mader, Claudia A.	Negative Archaeological Survey Report: 6-KIN-41 39.4/42.0 293500	Caltrans	
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-00119		2002	Ryan, C. and Hattersley-Drayton, K.	Historic Property Survey Report: 19th Avenue Interchange Project, State Route 198 Kings County, California 06-Kin-198 PM 8.68/10.08 06-32550	Central California Cultural Resources Branch, California Department of Transportation	
KI-00119A		2002	Hattersley-Drayton, Karana	Historic Architectural Survey Report for 19th Avenue Interchange Project, State Route 198, Kings County 06-Kin-198 PM 8.68/10.08 06-32550	Central California Cultural Resources Branch, California Department of Transportation	
KI-00119B		2002	Ryan, Christopher	Negative Archaeological Survey Report for the 19th Avenue Interchange Project, State Route 198, Kings County 06-Kin-198 PM 8.68/10.08 06-32550	Central California Cultural Resources Branch, California Department of Transportation	
KI-00140		2003	Varner, Dudley M.	A Cultural Resouce Study for the Tachi Yokuts Cultural Center Project, West Hills Community College District, Lemoore Campus, Kings County, California	Varner Associates	

Report List

SSJVIC Record Search 19-386

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
KI-00191	Submitter - CAR Project No. 09-30	2009	Girado, Amy and Orfila, Rebecca S.	A Cultural Resources Assessment of Approximately 70 Acres of Land for the City of Lemoore Arsenic Mitigation Program, Kings County, California	Center for Archaeological Research., California State University, Bakersfield	

Maps and Aerial Imagery Consulted

Date	Name	Author	Reference	Notes
1927	Lemoore, CA 1:31680	U.S. Geological Survey	1927 *Lemoore, Calif.* https://digitized.library.fresnostate.edu/digital/collection/topomap/id/354, accessed through Map and Aerial Locator Tool (MALT), Henry Madden Library, California State University, Fresno, October 1, 2019	Natural elongated N-S trending depression within the Project area and a natural spring with marshland to its south located northeast of the Project area. Several tributaries of the Kings River are noted southwest of the Project area.
1952	Metsker's Map of Kings County California	Metskekr's Map	1952 Metsker's Map of Kings County, CA https://digitized.library.fresnostate.edu/digital/collection/p17172coll3/id/16736, accessed through Map and Aerial Locator Tool (MALT), Henry Madden Library, California State University, Fresno, September 4, 2019	Depicts small tributaries southwest of the Project area.
1869		General Land Office	1896 General Lands Office Record of Township 19 South, Range 20 East, Mount Diablo Meridian, https://glorecords.blm.gov/details/survey/default.aspx?dm_id=379965&sid=fljzdlfd.lgl&surveyDetailsTabIndex=1 accessed through U.S. Department of the Interior Bureau of Land Management, General Land Office Records October 3, 2019	Depicts the Project area in Section 8, which is marshland environment.
1885	Hall Map	California State Engineering Department	Hall, William Hammond 1886 Topographical and Irrigation Map of the San Joaquin Valley, Lemoore/Hanford Sheet. California Department of Engineering, Sacramento, California.	Shows Tulare Lake in 1885 approximately 7 miles south of the Project area. Also shows pipeline likely running directly through Project area. This is also depicted on the 1962 Lemoore, CA USGS 7.5' Quad.
1892	Tulare County Atlas	Thompson, Thomas H.	Thompson, Thos H. 1892 Official Historical Atlas Map of Tulare County. Tulare, California.	Shows a possible structure in the Project area. The Western Pacific RR is noted north of the Project area in Section 8. Note "Indian cemetery" approximately 3 miles southeast of the Project area in Section 27.
1912	Kings County Map	Punnett Brothers	Punnett Brothers 1912 Map of Kings County Cal. San Francisco.	Depicts railroad through Section 8 and further development of the area.

CONFIDENTIAL APPENDIX*
Not for Public Distribution

APPENDIX C

Native American Outreach

*Archaeological site location information is exempt from the Freedom of Information Act (FOIA) and California Public Records Act (CPRA).

Applied EARTHWORKS Inc.

Native American Outreach Log

Tract 848 Development in the City of Lemoore, CA

Organization	Name	Position	Letter	E-mail	Phone	Summary of Contact
Native American Heritage Commission				9/27/19; 10/02/19		Request sent 09/27 - RO; Response received 10/02 - RO
Santa Rosa Rancheria Tachi Yokut Tribe	Rueben Barrios Sr.	Chairperson	10/31/19		11/12/19	Outreach letters sent - JJ. Left a message in the cultural resources department - RO. Communicated with S. Powers, Cultural Director of SRR who stated the area is in their ancestral territory and has high sensitivity.
Tule River Indian Tribe	Neil Peyron	Chairperson	10/31/19		11/12/19	Outreach letters sent - JJ. Left a voice message - RO.
Wuksache Indian Tribe/Eshom Valley Band	Kenneth Woodrow	Chairperson	10/31/19		11/12/19	Outreach letters sent - JJ. Left a voice message - RO.
Kings River Choinumni Farm Tribe	Stan Alec		10/31/19		11/12/19	Outreach letters sent - JJ. Contacted via phone. No issues with this project - RO.
Table Mountain Rancheria	Leanne Walker-Grant	Chairperson	10/31/19		11/12/19	Outreach letters sent - JJ. I spoke with Sara Barnett within thier cultural resources department. Sara reported that this Project area falls outside of their area of interest - RO.
Table Mountain Rancheria	Bob Pennell	Cultural Resources Director	10/31/19		11/12/19	Outreach letters sent - JJ. Contacted the cultural resources department. This project is outside their area of interest - RO.

STATE OF CALIFORNIA **GAVIN NEWSOM, Governor**

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691 Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov

October 2, 2019

Diana T. Dyste
Applied EarthWorks, Inc.

VIA Email to: ddyste@appliedearthworks.com

RE: Tract 848 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: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Staff Services Analyst

Attachment

Native American Heritage Commission
Native American Contacts List
October 2, 2019

Kings River Choinumni Farm Tribe
Stan Alec
3515 East Fedora Avenue
Fresno ,CA 93726
(559) 647-3227 Cell

Foothill Yokuts
Choinumni

Santa Rosa Rancheria Tachi Yokut Tribe
Rueben Barrios Sr., 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

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

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:
Tract 848 Project, Kings County.

EXAMPLE

Applied EARTHWORKS Inc.

1391 W. Shaw Ave., Suite C
Fresno, CA 93711-3600
O: (559) 229-1856 | F: (559) 229-2019

October 30, 2019

Rueben Barrios Sr.
Chairperson
Santa Rosa Rancheria Tachi Yokut Tribe
P.O. Box 8
Lemoore, CA 93245

RE: Lennar Central Valley Proposed Residential Development (Tract 848) in the City of Lemoore, California

Dear Mr. Rueben Barrios Sr.,

Applied EarthWorks, Inc. (Æ) is currently providing cultural resource services to Lennar Central Valley for the proposed residential development Tract 848 (Project) in Lemoore, Kings County, California. The Project would involve grading to achieve a level ground surface, soil compaction, vegetation grubbing, and excavation for installation of housing pads, access roads, as well as water, sewer, and utility lines for individual homes. As part of the City of Lemoore's (City) environmental review, the applicant is required to complete a cultural resource inventory for cultural resources (i.e., prehistoric or historic-era archaeological deposits or built-environment resources that are 50 years or older) within the proposed Project area.

The project area lies within Township 19 South, Range 20 East; Sections 8 and 9 on the USGS Lemoore, California 7.5-minute topographic quadrangle (see attached map). The Project is west of Highway 41 and east of West Hills College in the city of Lemoore. If you would like more detailed maps of the project area, please contact Æ and we would be more than happy to provide them.

On October 7, 2019, a records search was completed at the California Historical Resources Information System's (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC) at California State University, Bakersfield. The purpose of the records search was to identify previously recorded cultural resources and prior investigations within the Project area or surrounding 0.5-mile area. No previously recorded cultural resources were identified in the Project area.

Prior to the archaeological pedestrian survey, historical maps and aerial imagery observations helped to identify potential cultural resources or sensitive landforms that may contain cultural deposits within the Project area. The results of this archival research did not identify any potential sensitive areas. During the pedestrian survey on October 9-10, 2019, Æ Staff Archaeologist Wes Stanley and Flavio Silva conducted an intensive archaeological cultural resources pedestrian survey of the 93-acre Project area. The pedestrian survey resulted in no prehistoric sites, isolates, or features identified on the ground surface.

Please note that all information shared with Æ regarding this Project is considered best practices for cultural resource inventories and is not government-to-government consultation under Assembly Bill 52 or NHPA Section 106. The NAHC provided a negative Sacred Lands File and provided your name and address as someone who may be interested in sharing information regarding sacred sites, tribal cultural resources, or other cultural resources of importance in the Project area. In compliance with Pub. Resources Code § 21082.3[c][1], Æ will not disclose locational information in any document available to the general public.

If you would like to discuss information relevant to this Project, please contact me by phone (559) 229-1856 x123, by email at ddyste@appliedearthworks.com, or send a letter to my attention using the address in the header above.

Sincerely,

Diana T. Dyste
Senior Archaeologist and Project Manager

encl.: Project Map

APPENDIX D

GEOTECHNICAL REPORT

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
TRACT 848
BUSH STREET AND PEDERSEN STREET
LEMOORE, CALIFORNIA

PROJECT NO. 012-18019
MAY 8, 2018

Prepared for:

MR. BILL WALLS
LENNAR HOMES OF CALIFORNIA
8080 N. PALM AVENUE, SUITE 110
FRESNO, CALIFORNIA 93711

Prepared by:

KRAZAN & ASSOCIATES, INC.
GEOTECHNICAL ENGINEERING DIVISION
215 W. DAKOTA AVENUE
CLOVIS, CALIFORNIA 93612
(559) 348-2200

Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

May 8, 2018

KA Project No. 012-18019

Mr. Bill Walls
Lennar Homes of California
8080 N. Palm Avenue, Suite 110
Fresno, California 93711

RE: Geotechnical Engineering Investigation
Proposed Residential Development
Tract 848
Bush Street and Pedersen Street
Lemoore, California

Dear Mr. Walls:

In accordance with your request, we have completed a Geotechnical Engineering Investigation for the above-referenced site. The results of our investigation are presented in the attached report.

If you have any questions or if we may be of further assistance, please do not hesitate to contact our office at (559) 348-2200.

DAVID R. JAROSZ II
No. 2698
EXP JUNE 30 2018

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

David R. Jarosz, II
Managing Engineer
RCE No. 60185/RGE No. 2698

DRJ:ht

TABLE OF CONTENTS

Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

May 8, 2018 Project No. 012-18019

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
TRACT 848
BUSH STREET AND PEDERSEN STREET
LEMOORE, CALIFORNIA

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed Residential Development (Tract 848) to be located at the northeast corner of Bush Street and Pedersen Street in Lemoore, California. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, Engineered Fill, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior flatwork, retaining walls, soil cement reactivity, and pavement design.

A site plan showing the approximate boring locations is presented following the text of this report. A description of the field investigation, boring logs, and the boring log legend are presented in Appendix A. Appendix A contains a description of the laboratory-testing phase of this study; along with the laboratory test results. Appendices B and C contain guides to earthwork and pavement specifications. When conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

PURPOSE AND SCOPE

This investigation was conducted to evaluate the soil and groundwater conditions at the site, to make geotechnical engineering recommendations for use in design of specific construction elements, and to provide criteria for site preparation and Engineered Fill construction.

Our scope of services was outlined in our proposal dated January 31, 2018 (KA Proposal No. P095-18) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- A field investigation consisting of drilling 18 borings to depths ranging from approximately 10 to 20 feet for evaluation of the subsurface conditions at the project site.
- Performing laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.

- Evaluation of the data obtained from the investigation and an engineering analysis to provide recommendations for use in the project design and preparation of construction specifications.
- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

PROPOSED CONSTRUCTION

We understand that design of the proposed development is currently underway; structural load information and other final details pertaining to the structures are unavailable. On a preliminary basis, it is understood the development will include approximately 77.51 acres for the construction of single-family residential units. It is anticipated that the buildings will be single- or two-story wood-framed structures utilizing concrete slab-on-grade. Footing loads are anticipated to be light to moderate. On-site paved areas and landscaping are also planned for the development of the project.

In the event, these structural or grading details are inconsistent with the final design criteria, the Soils Engineer should be notified so that we may update this writing as applicable.

SITE LOCATION AND SITE DESCRIPTION

The site is irregular in shape and encompasses approximately 77.51 acres. The site is located at the northeast corner of Pedersen Street and College Avenue in Lemoore, California. The site is predominately surrounded by agricultural developments. West Hills College, a ponding basin and solar arrays are located to the west of the site.

Presently, the majority of the site is utilized for cultivation of cotton and corn. The western portion of the site was covered by a short grass growth. A chain link fence is located on the western boundary around the basin and solar arrays. Small trees are located along the northern edge of the site adjacent to an asphaltic concrete bike path. The surface soils have a loose consistency associated with weed control for the existing agricultural development. The site is relatively level with no major changes in grade.

GEOLOGIC SETTING

The San Joaquin Valley, which includes the Lemoore area, is a topographic and structural basin that is bounded on the east by the Sierra Nevada Mountains and on the west by the Coast Ranges. The Sierra Nevadas, a fault block dipping gently southwestward, is made up of igneous and metamorphic rocks of pre-Tertiary age that comprise the basement complex beneath the Valley. The Coast Ranges contain folded and faulted sedimentary rocks of Mesozoic and Cenozoic age, which are similar to those rocks that underlie the Valley at depth and non-conformably overlie the basement complex; gently dipping to nearly horizontal sedimentary rocks of Tertiary and Quaternary age overlie the older rocks. These younger rocks are mostly of continental origin and in the Lemoore area, they were derived from the Sierra Nevadas.

The Coast Ranges evolved as a result of folding, faulting, and accretion of diverse geologic terrains. They are composed chiefly of sedimentary and metamorphic rocks that are sharply deformed into complex structures. They are broken by numerous faults, the San Andreas Fault being the most notable structural feature.

Both the Sierra Nevada and Coast Range are geologically young mountain ranges and possess active and potentially active fault zones. Major active faults and fault zones occur at some distance to the east, west, and south of the Lemoore area. The Owens Valley Fault Zone bounds the eastern edge of the Sierra Nevada block and contains both active and potentially active faults.

Portions of the Ortigalita, Calaveras, Hayward, and Rinconada Faults, which are to the west, are considered potentially active. The San Andreas Fault is possibly the best known fault and is located about 60 to 70 miles to the west.

There are no active fault traces in the project vicinity. Accordingly, the project area is not within an Earth Quake Fault Zone (Special Studies Zone) and will not require a special site investigation by an Engineering Geologist.

Lemoore residents could feel the affects of a large seismic event on one of the nearby active or potentially active fault zones. Lemoore has experienced groundshaking from earthquakes in the historical past. According to the Five County Seismic Safety Element, groundshaking of VII intensity (Modified Mercali Scale) was felt in Lemoore from the 1872 Owens Valley Earthquake. This is the largest known earthquake event affecting the Lemoore area.

Secondary hazards from earthquakes include rupture, seiche, landslides, liquefaction, and subsidence. Since there are no known faults within the immediate area, ground rupture from surface faulting should not be a potential problem. Seiche and landslides are not hazards in the area either. Lastly, deep subsidence problems may be low to moderate according to the conclusions of the Five County Seismic Safety Element. However, there are no known occurrences of structural or architectural damage due to deep subsidence in the Lemoore area.

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling 18 borings to depths ranging from approximately 10 to 20 feet below existing site grade, using a truck-mounted drill rig. In addition, 5 bulk subgrade samples were obtained from the site for laboratory R-value testing. The approximate boring and bulk sample locations are shown on the site plan. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsoils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory-testing program was formulated with emphasis on the evaluation of natural moisture, density, gradation, shear strength, consolidation potential, expansion potential, R-value and of the materials encountered. In addition, chemical tests were performed to evaluate the corrosivity of the soils for buried concrete and metal. Details of the laboratory test program and results of the laboratory tests are summarized in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the upper soils consisted of approximately 6 to 12 inches of very loose clayey silty sand, sandy silt or sandy silt with trace clay. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated.

Beneath the loose surface soils, approximately 4 to 8 feet of loose to medium dense silty sand, sandy silt, sandy silt with trace clay and clayey silty sand or firm to very stiff sandy clay, silty clay and sandy silty clay were encountered. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. The clayey soils have a moderate to high swell potential. Penetration resistance ranged from 10 to 37 blows per foot. Dry densities ranged from 82 to 128 pcf. Representative soil samples consolidated approximately 1½ to 4 percent under a 2 ksf load when saturated. Representative soil samples had angles of internal friction of 22 and 29 degrees. Representative samples of the clayey soil had expansion indices between 31 and 90.

Below approximately 4½ to 9 feet, predominately loose to medium dense silty sand, clayey silty sand, silty sand/sand and sand or very stiff sandy silty clay, sandy clay and clayey sand/sandy clay were encountered. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance ranged from 7 to 36 blows per foot. Dry densities ranged from 71 to 122 pcf. These soils had similar strength characteristics as the upper soils and extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the logs of borings in Appendix A.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was encountered at depths of approximately 9 to 14 feet during our subsurface investigation.

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

Administrative Summary

In brief, the subject site and soil conditions, with the exception of the loose surface soils, expansive nature of the clayey soils, and existing development, appear to be conducive to the development of the project. The surface soils have a loose consistency. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated. Accordingly, it is recommended that these surface soils be recompacted. The intent is to stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

Fill material was not encountered within our borings. However, fill may be encountered between our boring locations. It is anticipated the fill material will consist of clayey silty sand and sandy clay. The thickness and extent of the fill material was determined based on visual observation. Thicker fill may be present at the site. It is recommended that fill soils which are not properly compacted and certified be excavated and stockpiled so that the native soils can be properly prepared. The fill material should be moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Prior to fill placement Krazan & Associates, Inc., should inspect the bottom of the excavation to verify no additional removal will be required.

The site was previously utilized for agricultural purposes. Associated with these developments are buried structures, such as utility lines, irrigation lines, standpipes, septic systems and water wells. Any buried structures encountered during construction should be removed and/or relocated. Demolition activities should include proper removal of any buried structures. The resulting excavations should be backfilled with Engineered Fill. It is suspected demolition of the existing structures will disturb the upper soils. Areas disturbed by demolition operations should be excavated to firm native ground. The resulting excavations should be backfilled with Engineered Fill. Water wells should be abandoned in accordance with county standards.

Several trees are located along the northern edge of the site. Tree removal operations should include roots greater than 1 inch in diameter. The resulting excavations should be backfilled with Engineered Fill compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

The on-site clayey soils appear to have a moderate to high shrink/swell potential. To reduce potential soil movement related to shrink/swell of the clayey soils, it is recommended that slab-on-grade and exterior flatwork areas be supported by at least 30 inches of non-expansive Engineered Fill. The fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive soils below, which may result in soil swelling. The replacement soils and/or upper 30 inches of Imported Fill soils should meet the specifications as described under the subheading Engineered Fill. The replacement soils should extend 5 feet beyond the perimeter of slab-on-grade areas. The non-expansive replacement soils should be compacted to at least 90 percent of relative compaction based on ASTM Test Method D1557. The exposed native soils in the excavation should not be allowed to dry out and should be kept continually moist, prior to backfilling. In addition, it is recommended that slab-on-grade, continuous footings and slabs be nominally reinforced to reduce cracking and vertical off-set.

As an alternative to the use of non-expansive soils, the upper 30 inches of soil supporting the slab areas can consist of lime-treated clayey soils. The lime-treated soils should be recompacted to a minimum of 90 percent of maximum density. Preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. The clayey soils should be above optimum moisture during the mixing operations.

In lieu of the use of non-expansive soils or lime-treated soils, the moisture content of the top 30 inches of soil supporting slabs-on-grade may be moisture-conditioned to between 3 and 5 percent above optimum moisture content. The moisture-conditioned clayey soils should be removed and recompacted to between 90 and 95 percent of maximum density based on ASTM Test Method D1557. Over-compaction of the clayey material may result in excessive post-construction swell pressures. In any event, some post-construction movement of the reworked soil is expected, but careful moisture and compaction control should reduce the swell potential. If construction takes place during the winter, early spring, or if the contractor elects to pond the building site, the moisture content may be relatively high. It may not be necessary to remove and moisture-condition the soil if the moisture content and relative density are as recommended. The moisture within the clayey soils should be maintained or re-established immediately before concrete pouring. Moisture contents within the upper 30 inches of soils should be verified by our office within 48 hours of concrete pouring. If this option is utilized, exterior footings should have a minimum embedment depth of 30 inches.

Sandy soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy soils.

After completion of the recommended site preparation and over-excavation, the site should be suitable for shallow footing support. The proposed structure footings may be designed utilizing an allowable bearing pressure of 2,000 psf for dead-plus-live loads. Footings should have a minimum embedment of 12 inches for the soil replacement alternatives and 30 inches for the moisture-conditioning option.

Groundwater Influence on Structures/Construction

During our recent field investigation groundwater was encountered at approximately 9 to 14 feet below existing site grade. Therefore dewatering and/or waterproofing may be required should structures or excavations extend below this depth. If groundwater is encountered, our firm should be consulted prior to dewatering the site. Installation of a standpipe piezometer is suggested prior to construction should groundwater levels be a concern.

In addition to the groundwater level if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Site Preparation

General site clearing should include removal of vegetation; debris; existing utilities; structures including foundations; basement walls and floors; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for use as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

The site is presently utilized as agricultural land. Associated with these developments are buried structures, such as utility lines, irrigation lines, standpipes, septic systems and water wells. Any buried structures, utilities or loosely backfilled excavations encountered during construction should be properly removed and/or relocated. After demolition activities, it is recommended that these disturbed soils be removed and/or recompacted. Excavations, depressions, or soft and pliant areas extending below planned finish subgrade level should be cleaned to firm undisturbed soil, and backfilled with Engineered Fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. The water wells should be abandoned in accordance with the county standards. Any other buried structures should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

Fill material was not encountered within our borings. However, fill may be encountered between our boring locations. It is anticipated the fill material will consist of clayey silty sand and sandy clay. The thickness and extent of the fill material was determined based on visual observation. Thicker fill may be present at the site. It is recommended that fill soils which are not properly compacted and certified be excavated and stockpiled so that the native soils can be properly prepared. The fill material should be moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Prior to fill placement Krazan & Associates, Inc., should inspect the bottom of the excavation to verify no additional removal will be required.

Several trees are located along the northern edge of the site. Tree removal operations should include roots greater than 1 inch in diameter. The resulting excavations should be backfilled with Engineered Fill, compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Following stripping, fill removal, tree removal operations, and demolition activities, the exposed subgrade within proposed building pad areas should be excavated to a depth of at least 12 inches, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Limits of recompaction should extend 5 feet beyond structural elements. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

Following stripping, fill removal, tree removal operations, and demolition activities, the exposed subgrade within proposed exterior flatwork and pavement areas should be excavated/scarified to a depth of at least 12 inches, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Limits of recompaction should extend 2 feet beyond structural elements. This compaction effort should stabilize the surface soils and locate any unsuitable or pliant areas not found during our field investigation.

It is recommended that the upper 30 inches of soil within proposed slab-on-grade and exterior flatwork areas consist of non-expansive Engineered Fill or lime-treated Engineered Fill. The fill placement serves two functions: 1) it provides a uniform amount of soil which will more evenly distribute the soil pressures and 2) it reduces moisture content fluctuation in the clayey material beneath the building area. The non-expansive fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive clayey soil below, which may result in soil swelling. Imported Fill should be approved by the Soils Engineer prior to placement. The fill should be placed as specified as Engineered Fill. In addition, it is recommended slabs-on-grade and foundations be nominally reinforced to reduce cracking and vertical offsets.

In lieu of the use of non-expansive soils or lime-treated soils, the moisture content of the top 30 inches of expansive soil should be increased by removing the soil and carefully and thoroughly moisture-conditioning to between 3 and 5 percent above optimum moisture content. The moisture-conditioned clayey soils should be recompacted to between 90 and 95 percent of maximum density based on ASTM Test Method D1557. Over-compaction of the clayey material may result in excessive post-construction swell pressures. In any event, some post-construction movement of the reworked soil is expected, but careful moisture and compaction control should reduce the swell potential. If construction takes place during the winter, early spring, or if the contractor elects to pond the building site, the moisture content may be relatively high. It may not be necessary to remove and moisture-condition the soil if the moisture content and relative density are as recommended. The moisture within the clayey soils should be maintained or re-established immediately before concrete pouring. Moisture contents within the upper 30 inches of soils should be verified by our office within 48 hours of concrete pouring. If this option is utilized, exterior footings should have a minimum embedment depth of 30 inches.

The upper soils, during wet winter months, become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

Engineered Fill

The on-site, upper, native and fill soils are predominately clayey silty sand, sandy clay, sandy silty clay and silty sand. The soils that do not contain clay will be suitable for reuse as non-expansive Engineered Fill, provided they are cleansed of excessive organics and debris. However, it may be difficult for the grading contractor to separate these materials during mass grading operations. The on-site clayey soils will not be suitable for reuse as non-expansive Engineered Fill. The clayey soils will be suitable for reuse for fill placement within the upper 30 inches of slab-on-grade and exterior flatwork areas, provided they are lime-treated. The preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. The clayey soils should be above optimum moisture-condition during mixing operations. Additional testing is recommended to determine the appropriate application rate of lime prior to placement. These clayey soils will be suitable for reuse as General Engineered Fill, provided they are cleansed of excessive organics, debris, and moisture-conditioned to at least 2 percent above optimum moisture. The clayey soils should be cleansed of excessive organics, debris and moisture-conditioned to at least 2 percent above optimum moisture content during placement. During construction it is recommended that additional tests be performed on the on-site soils to verify their physical and index properties.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since he has complete control of the project site at that time.

Imported Fill should consist of a well-graded, slightly cohesive, fine silty sand or sandy silt, with relatively impervious characteristics when compacted. This material should be approved by the Soils Engineer prior to use and should typically possess the following characteristics:

Percent Passing No. 200 Sieve	20 to 50
Plasticity Index	10 maximum
UBC Standard 29-2 Expansion Index	15 maximum

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and compacted to achieve at least 90 percent of maximum density based on ASTM D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

Drainage and Landscaping

The ground surface should slope away from building pad and pavement areas toward appropriate drop inlets or other surface drainage devices. In accordance with Section 1804 of the 2016 California Building Code, it is recommended that the ground surface adjacent to foundations be sloped a minimum of 5 percent for a minimum distance of 10 feet away from structures, or to an approved alternative means of drainage conveyance. Swales used for conveyance of drainage and located within 10 feet of foundations should be sloped a minimum of 2 percent. Impervious surfaces, such as pavement and exterior concrete flatwork, within 10 feet of building foundations should be sloped a minimum of 1 percent away from the structure. Drainage gradients should be maintained to carry all surface water to collection facilities and off-site. These grades should be maintained for the life of the project.

Utility Trench Backfill

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards by a Contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the Contractor. Traffic and vibration adjacent to trench walls should be minimized; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

Sandy soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy soils.

Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. The utility trench backfill placed in pavement areas should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. Pipe bedding should be in accordance with pipe manufacturer's recommendations.

The Contractor is responsible for removing all water-sensitive soils from the trench regardless of the backfill location and compaction requirements. The Contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

Foundations

After completion of the recommended site preparation, the site should be suitable for shallow footing support. The proposed structures may be supported on a shallow foundation system bearing on undisturbed native soil or on Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	1,500 psf
Dead-Plus-Live Load	2,000 psf
Total Load, including wind or seismic loads	2,650 psf

Structures should have exterior wall footing placed at least 12 inches deep for the soil replacement or lime treatment alternate, and 30 inches for reworking of the expansive soil alternate. Depths cited should be measured from rough grade or exterior grade, whichever is lower. The interior footings should be at least 12 inches below subgrade. The placement of continuous perimeter footings at the recommended depth will have an encapsulation will retard moisture fluctuations in the soil and should reduce post-construction soil movement. Actual foundation movement cannot be accurately determined because it will be influenced by post-construction moisture fluctuation, such as landscape water. However, movement is expected to be less than 1½ inches.

The total movement is not expected to exceed 1 inch. Differential movement should be less than ½ inch. Most of the settlement is expected to occur during construction as the loads are applied. However, additional post-construction movement may occur if the foundation soils are flooded or saturated.

The footing excavation should not be allowed to dry out at any time prior to pouring concrete. It is recommended that footings be reinforced by at least one No. 4 reinforcing bar in both top and bottom. Ultimate design of foundations and reinforcement should be performed by the project Structural Engineer.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.30 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 250 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A ⅓ increase in the above value may be used for short duration, wind, or seismic loads.

Floor Slabs and Exterior Flatwork

Concrete slab-on-grade floors should be underlain by a water vapor retarder. The water vapor retarder should be installed in accordance with accepted engineering practice.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. All fills required to bring the building pads to grade should be Engineered Fills.

It is recommended that the concrete slabs be reinforced with a minimum of #3 bars at 18 inches on center to reduce crack separation and possible vertical offset at the cracks. Ultimate design of floor slabs and reinforcement should be performed by the project Structural Engineer.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To reduce moisture vapor intrusion, it is recommended that a vapor retarder be installed. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to reduce the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure (i.e. ventilation fans) is recommended to reduce the accumulation of interior moisture.

Lateral Earth Pressures and Retaining Walls

Walls retaining horizontal backfill and capable of deflecting a minimum of 0.1 percent of its height at the top may be designed using an equivalent fluid active pressure of 50 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 70 pounds per square foot per foot per depth. Expansive soils should not be used for backfill against walls. The wedge of non-expansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 2:1 (horizontal to vertical) or flatter. The stated lateral earth pressures do not include the effects of hydrostatic water pressures generated by infiltrating surface water that may accumulate behind the retaining walls; or loads imposed by construction equipment, foundations, or roadways.

Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have a minimum width of 12 inches wide and should extend upward to within 12 inches of the top of the wall. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic concrete or other suitable backfill to reduce surface drainage into the wall drain system. The aggregate should conform to Class 2 permeable materials graded in accordance with the CalTrans Standard Specifications (2010). Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel provided they are installed in accordance with the manufacturer's recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.

Drainage pipes should be placed with perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The pipes should be placed no higher than 6 inches above the heel of the wall in the center line of the drainage blanket and should have a minimum diameter of 4 inches. Collector pipes may be either slotted or perforated. Slots should be no wider than ⅛ inch in diameter, while perforations should be no more than ¼ inch in diameter. If retaining walls are less than 6 feet in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 4-inch diameter holes (concrete walls) or unmortared head joints (masonry walls) and not be higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to the CalTrans Standard Specifications for "edge drains") should be affixed to the rear wall opening of each weep hole to retard soil piping.

During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers," vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

R-Value Test Results and Pavement Design

Five subgrade soil samples were obtained from the project site for R-value testing at the locations shown on the attached site plan. The samples were tested in accordance with the State of California Materials Manual Test Designation 301. Results of the tests are as follows:

Sample	Depth	Description	R-Value at Equilibrium
1	12-24"	Sandy Clay (CL)	Less than 5
2	12-24"	Clayey Sand/Sandy Clay (SC/CL)	17
3	12-24"	Clayey Sand/Sandy Clay (SC/CL)	14
4	12-24"	Clayey Sand/Sandy Clay (SC/CL)	20
5	12-24"	Clayey Sand/Sandy Clay (SC/CL)	11

The test results are moderate and indicate poor subgrade support characteristics under dynamic traffic loads. It is recommended supplemental R-value testing be performed after grading to verify the subgrade R-values. The following table shows the recommended pavement sections for various traffic indices based on an average R-value of 13.

Traffic Index	Asphaltic Concrete	Class II Aggregate Base*	Class III Aggregate Subbase	Compacted Subgrade**
4.0	2.0"	7.5"	--	12.0"
4.0	2.0"	4.5"	3.5"	12.0"
4.5	2.5"	8.0"	--	12.0"
4.5	2.5"	4.0"	4.0"	12.0"
5.0	2.5"	9.5"	--	12.0"
5.0	2.5"	5.0"	5.0"	12.0"
5.5	3.0"	10.0"	--	12.0"
5.5	3.0"	5.0"	5.0"	12.0"
6.0	3.0"	12.0"	--	12.0"
6.0	3.0"	6.5"	6.0"	12.0"
6.5	3.5"	12.5"	--	12.0"
6.5	3.5"	6.0"	7.0"	12.0"
7.0	4.0"	13.5"	--	12.0"
7.0	4.0"	6.5"	7.5"	12.0"
7.5	4.0"	15.0"	--	12.0"
7.5	4.0"	7.5"	8.0"	12.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 90% compaction based on ASTM Test Method D1557 or CAL 216*

If traffic indices are not available, an estimated (typical value) index of 4.5 may be used for light automobile traffic and an index of 7.0 may be used for light truck traffic.

The following recommendations are for light-duty and heavy-duty Portland Cement Concrete pavement sections.

PORTLAND CEMENT PAVEMENT
LIGHT DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
4.5	6.0"	5.0"	12.0"

HEAVY DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
7.0	7.0"	6.0"	12.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 90% compaction based on ASTM Test Method D1557 or CAL 216*
****Minimum compressive strength of 3000 psi*

Seismic Parameters – 2016 California Building Code

The Site Class per Section 1613 of the 2016 California Building Code (2016 CBC) and Table 20.3-1 of ASCE 7-10 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2016 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.3.2
Site Coefficient F_a	1.120	Table 1613.3.3 (1)
S_s	0.950	Section 1613.3.1
S_{MS}	1.064	Section 1613.3.3
S_{DS}	0.709	Section 1613.3.4
Site Coefficient F_v	1.715	Table 1613.3.3 (2)
S_1	0.342	Section 1613.3.1
S_{M1}	0.587	Section 1613.3.3
S_{D1}	0.392	Section 1613.3.4

Soil Cement Reactivity

Excessive sulfate in either the soil or native water may result in an adverse reaction between the cement in concrete (or stucco) and the soil. HUD/FHA and UBC have developed criteria for evaluation of sulfate levels and how they relate to cement reactivity with soil and/or water.

Soil samples were obtained from the site and tested in accordance with State of California Materials Manual Test Designation 417. The sulfate concentrations detected from these soil samples were greater than 1500 ppm and are above the maximum allowable values established by HUD/FHA and UBC. Therefore, it is recommended a Type V cement be utilized to compensate for sulfate reactivity with the cement.

Compacted Material Acceptance

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent on the stability of that material. The Soils Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with an in situ moisture content significantly less than optimum moisture. This type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

Testing and Inspection

A representative of Krazan & Associates, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

LIMITATIONS

Soils Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using the most appropriate and most current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 2 years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Soils Engineer should be notified so that supplemental recommendations may be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The Soils Engineer should be notified of any changes so the recommendations may be reviewed and re-evaluated.

This report is a Geotechnical Engineering Investigation with the purpose of evaluating the soil conditions in terms of foundation design. The scope of our services did not include any Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

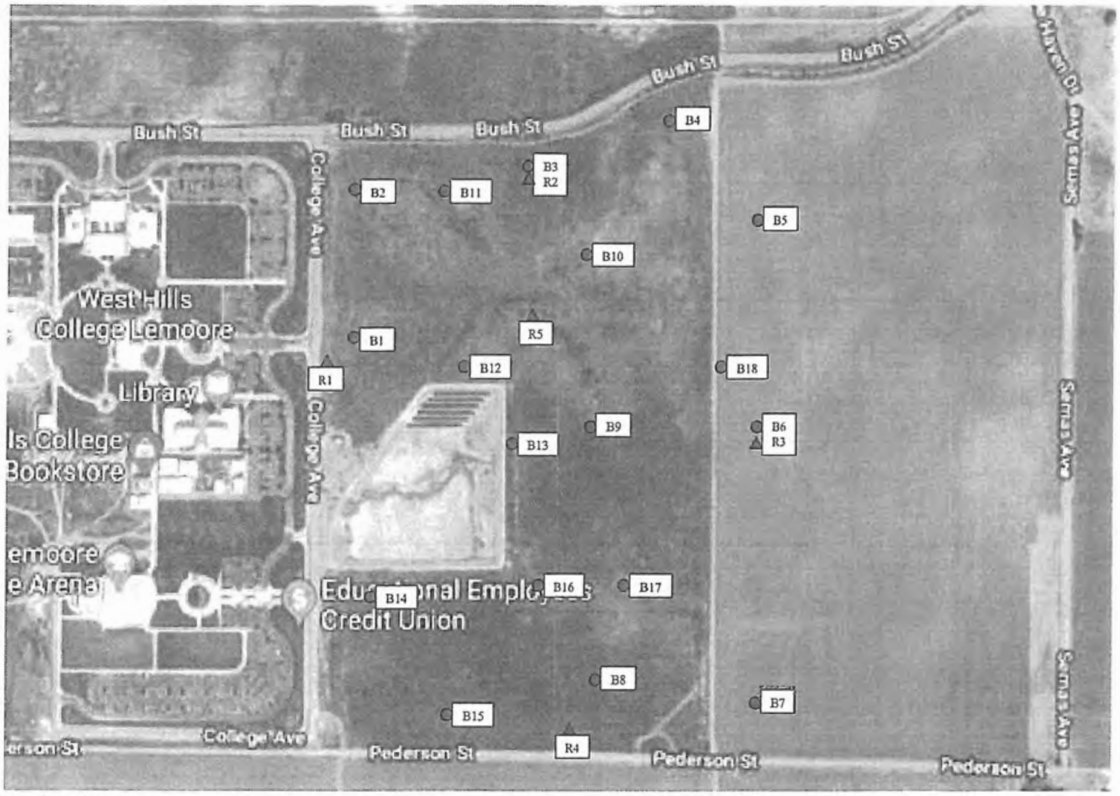
If you have any questions or if we may be of further assistance, please do not hesitate to contact our office at (559) 348-2200.

DAVID R. JAROSZ II
No. 2698
EXP. JUNE 30 2016

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

David R. Jarosz, II
Managing Engineer
RCE No. 60185/RGE No. 2698

DRJ:ht



● APPROXIMATE BORING LOCATION

▲ APPROXIMATE R-VALUE LOCATION

SITE MAP	Scale: NTS	Date: March 2018	Krazan GEOTECHNICAL ENGINEERING
Tract 848 Bush Street and Pederson Street Lemoore, California	Drawn by: HT	Approved by: DJ	
	Project No. 012-18019	Figure No. 1	

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploratory program. Eighteen 4½-inch exploratory borings were advanced. The boring locations are shown on the site plan.

The soils encountered were logged in the field during the exploration and, with supplementary laboratory test data, are described in accordance with the Unified Soil Classification System.

Modified standard penetration tests and standard penetration tests were performed at selected depths. This test represents the resistance to driving a 2½-inch diameter core barrel. The driving energy was provided by a hammer weighing 140 pounds falling 30 inches. Relatively undisturbed soil samples were obtained while performing this test. Bag samples of the disturbed soil were obtained from the auger cuttings. All samples were returned to our Clovis laboratory for evaluation.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the foundation soil underlying the site. Test results were used as criteria for determining the engineering suitability of the surface and subsurface materials encountered.

In situ moisture content, dry density, consolidation, direct shear, and sieve analysis tests were determined for the undisturbed samples representative of the subsurface material. Atterberg limits, expansion index and R-value tests were completed for select bag samples obtained from the auger cuttings. These tests, supplemented by visual observation, comprised the basis for our evaluation of the site material.

The logs of the exploratory borings and laboratory determinations are presented in this Appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
	Clean Gravels (Less than 5% fines)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	▨	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	▨	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
	▨	GM	Silty gravels, gravel-sand-silt mixtures
	▨	GC	Clayey gravels, gravel-sand-clay mixtures
	Clean Sands (Less than 5% fines)		
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	▨	SW	Well-graded sands, gravelly sands, little or no fines
	▨	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
	▨	SM	Silty sands, sand-silt mixtures
	▨	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%	▨	ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
	▨	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	▨	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	▨	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	▨	CH	Inorganic clays of high plasticity, fat clays
	▨	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	▨	PT	Peat and other highly organic soils

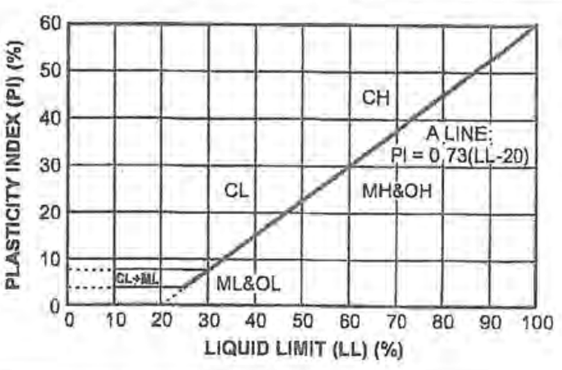
CONSISTENCY CLASSIFICATION

Description	**Blows per Foot**
Granular Soils	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
Cohesive Soils	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION

Grain Type	*Standard Sieve Size*	*Grain Size in Millimeters*
Boulders	Above 12 inches	Above 305
Cobbles	12 to 13 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.042
Fine-grained	No. 40 to No. 200	0.042 to 0.074
Silt and Clay	Below No. 200	Below 0.074

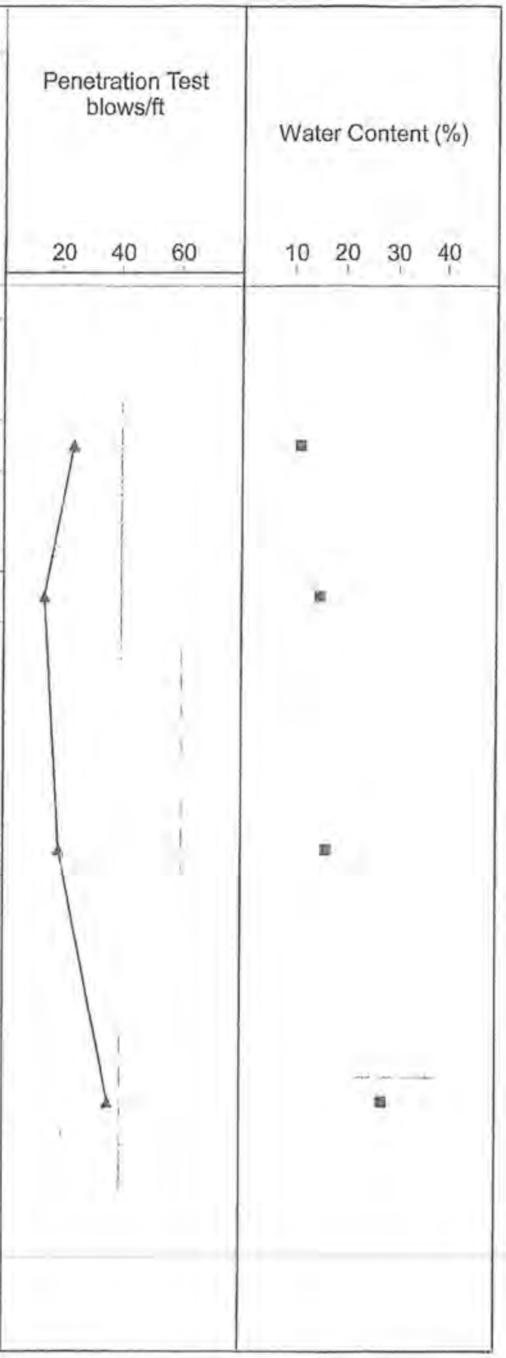
PLASTICITY CHART



Log of Boring B1

Project: Tract 848
Project No: 012-18019
Client: Lennar Homes of California
Figure No.: A-1
Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: Dave Adams
Depth to Water> **Initial:** 14 Feet **At Completion:** 14 Feet

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2 4	▨	***SANDY SILTY CLAY (CL)*** Very stiff, fine- to medium-grained; brown, moist, drills easily		11.3	■	24
6 8	▨	Stiff below 5 feet	111.4	15.2	■	14
10 12	▨	***CLAYEY SILTY SAND (SM/SC)*** Medium dense, fine- to medium-grained; gray, moist, drills easily ▽	110.8	16.6	■	19
14 16 18 20	▨	***CLAYEY SAND/SANDY CLAY (SC/CL)*** Very stiff, fine- to medium-grained; gray, saturated, drills easily	101.5	27.6	■	36



Drill Method: Solid Flight
Drill Date: 2-2-18
Drill Rig: CME 45C-3

Krazan and Associates

Hole Size: 4½ Inches
Driller: Jim Watts
Elevation: 20 Feet
Sheet: 1 of 1

Log of Boring B2

Project: Tract 848

Project No: 012-18019

Client: Lennar Homes of California

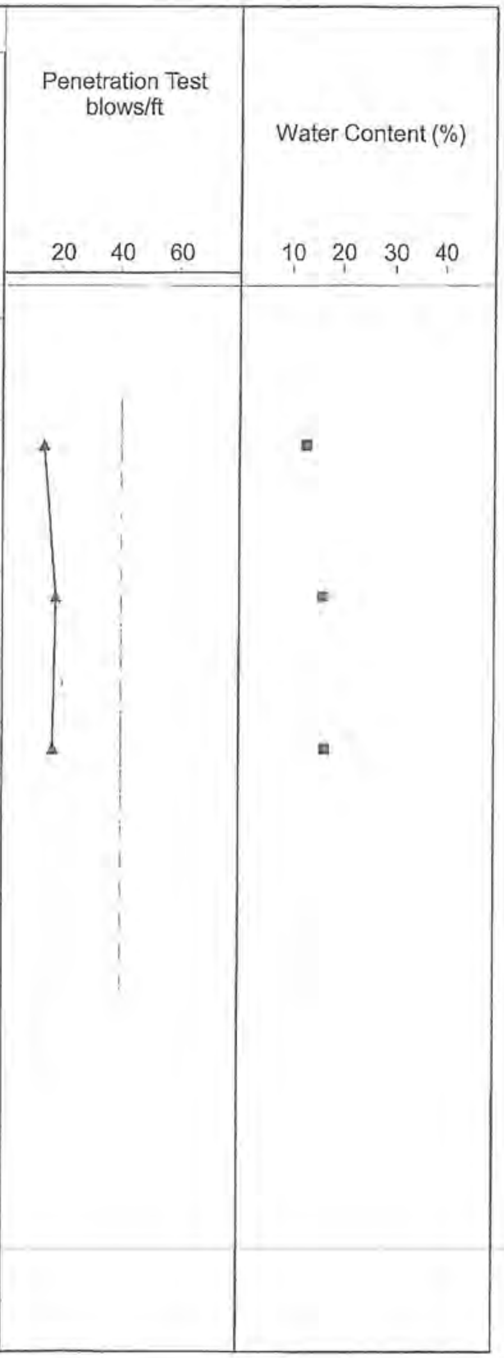
Figure No.: A-2

Location: Bush Street and Pederson Street, Lemoore, CA

Logged By: Dave Adams

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
	▨	***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2			88.2	13.0	■	14
	▨	***SANDY SILTY CLAY (CL)*** Stiff, fine- to medium-grained; brown, moist, drills easily				
4						
6			111.3	16.2	■	18
	▨	***CLAYEY SILTY SAND (SM/SC)*** Medium dense, fine- to medium-grained; gray, moist, drills easily				
8			114.0	16.7	■	17
10						
12						
14						
		End of Borehole				
16						
18						
20						



Drill Method: Solid Flight

Drill Date: 2-2-18

Drill Rig: CME 45C-3

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 15 Feet

Sheet: 1 of 1

Log of Boring B3

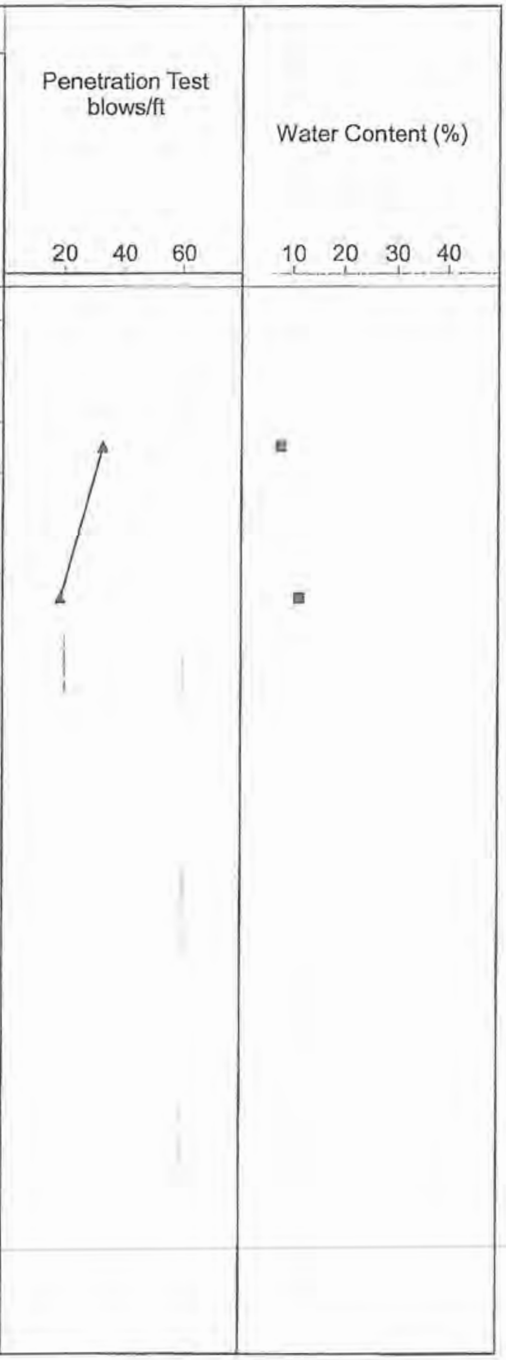
Project: Tract 848
Project No: 012-18019

Client: Lennar Homes of California
Figure No.: A-3

Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: Dave Adams

Depth to Water>
Initial: None
At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0–2	▨	***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2	▨	***SANDY SILTY CLAY (CL)*** Very stiff, fine- to medium-grained; brown, damp, drills easily	96.0	7.9	■	33
5	▨	Stiff and moist below 5 feet	113.7	11.5	■	19
10		End of Borehole				



Drill Method: Solid Flight
Drill Date: 2-2-18

Drill Rig: CME 45C-3
Hole Size: 4½ Inches

Krazan and Associates

Driller: Jim Watts
Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B4

Project: Tract 848

Project No: 012-18019

Client: Lennar Homes of California

Figure No.: A-4

Location: Bush Street and Pederson Street, Lemoore, CA

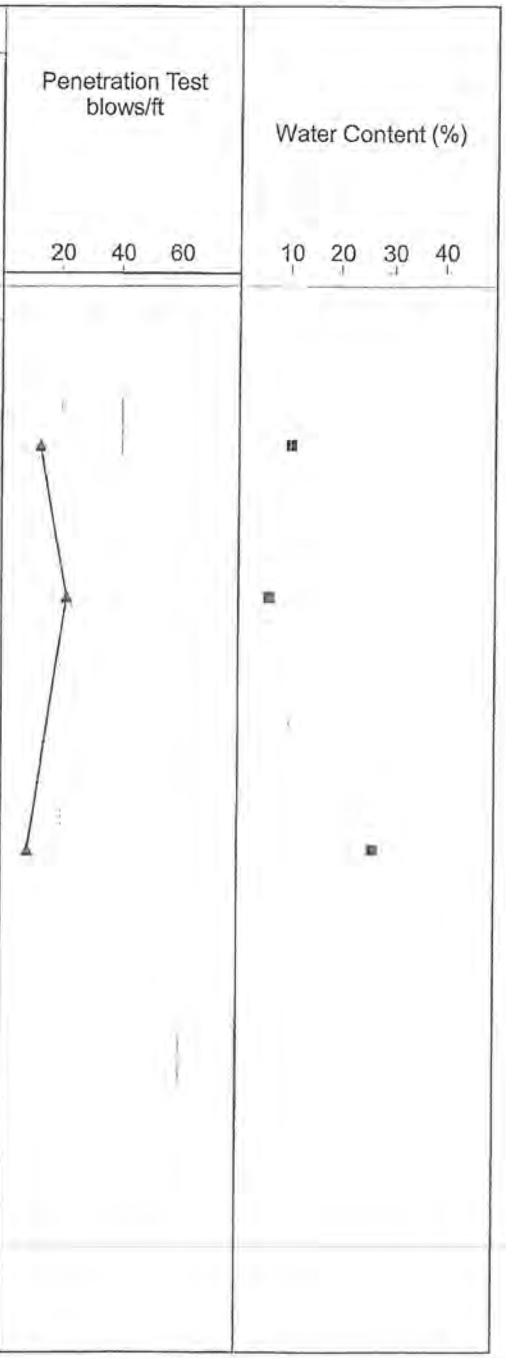
Logged By: Dave Adams

Depth to Water>

Initial: 9 Feet

At Completion: 9 Feet

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
		CLAYEY SILTY SAND (SM/SC) Very loose, fine- to medium-grained; brown, moist, drills easily				
2		***SANDY SILTY CLAY (CL)*** Stiff, fine- to medium-grained; brown, moist, drills easily	121.2	10.2	■	13
4		***SILTY SAND (SM)*** Medium dense, fine- to medium-grained; grayish-brown, moist, drills easily	128.0	6.1	■	22
6						
8		***SAND (SP)*** Loose, fine- to medium-grained; light brown, very moist, drills easily Saturated below 9 feet				
10			92.4	26.6	■	9
12						
14						
16						
18						
20						



Drill Method: Solid Flight

Drill Date: 2-2-18

Drill Rig: CME 45C-3

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B5

Project: Tract 848

Project No: 012-18019

Client: Lennar Homes of California

Figure No.: A-5

Location: Bush Street and Pederson Street, Lemoore, CA

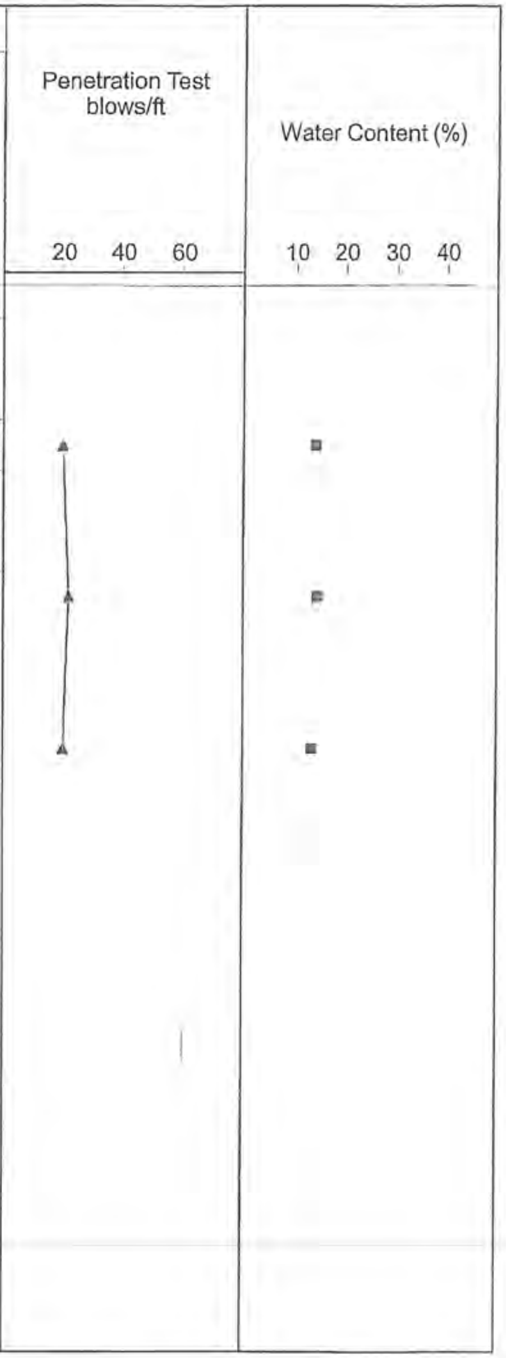
Logged By: Dave Adams

Depth to Water>

Initial: None

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
		SANDY SILTY CLAY (CL) Very stiff, fine- to medium-grained; gray, damp, drills easily	117.6	14.2	■	20
			117.6	14.5	■	22
		CLAYEY SILTY SAND (SM/SC) Medium dense, fine- to medium-grained;brown, very moist, drills easily	101.3	13.4	■	20
10		***SAND (SP)*** Medium dense, fine- to medium-grained; light brown, saturated, drills easily				
		End of Borehole				
20						



Drill Method: Solid Flight

Drill Rig: CME 45C-3

Driller: Jim Watts

Krazan and Associates

Drill Date: 2-2-18

Hole Size: 4½ Inches

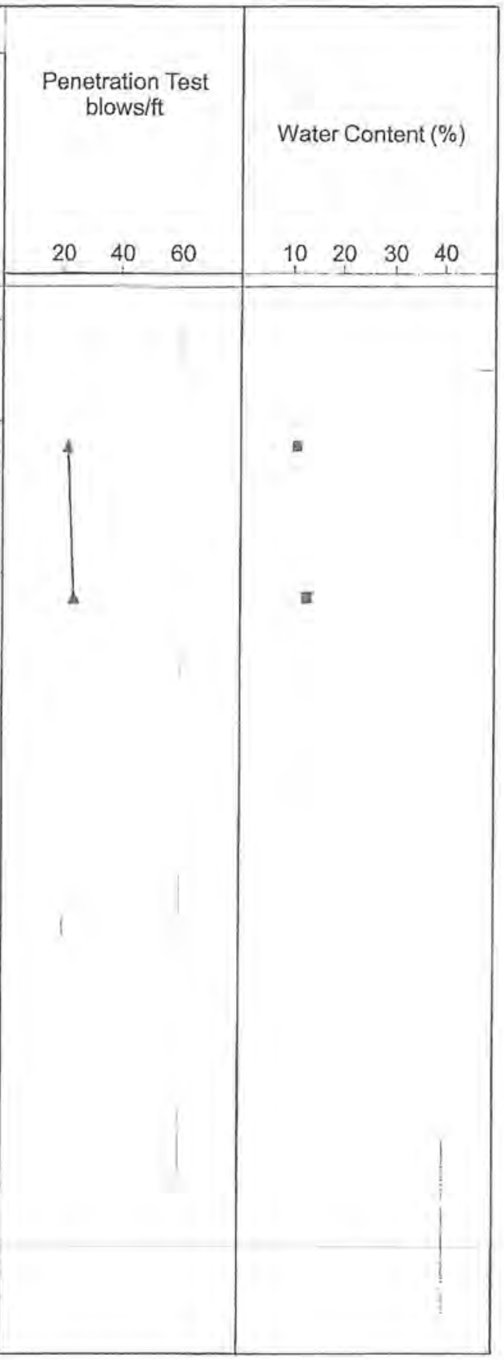
Elevation: 15 Feet

Sheet: 1 of 1

Log of Boring B6

Project: Tract 848
Project No: 012-18019
Client: Lennar Homes of California
Figure No.: A-6
Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: Dave Adams
Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2		***SANDY SILTY CLAY (CL)*** Very stiff, fine- to medium-grained; brown, damp, drills easily		11.0	■	22
5		***CLAYEY SILTY SAND (SM/SC)*** Medium dense, fine- to medium-grained; brown, moist, drills easily	122.4	13.0	■	24
10		End of Borehole				



Drill Method: Solid Flight
Drill Date: 2-2-18
Drill Rig: CME 45C-3
Krazan and Associates
Hole Size: 4½ Inches
Driller: Jim Watts
Elevation: 10 Feet
Sheet: 1 of 1

Log of Boring B7

Project: Tract 848

Project No: 012-18019

Client: Lennar Homes of California

Figure No.: A-7

Location: Bush Street and Pederson Street, Lemoore, CA

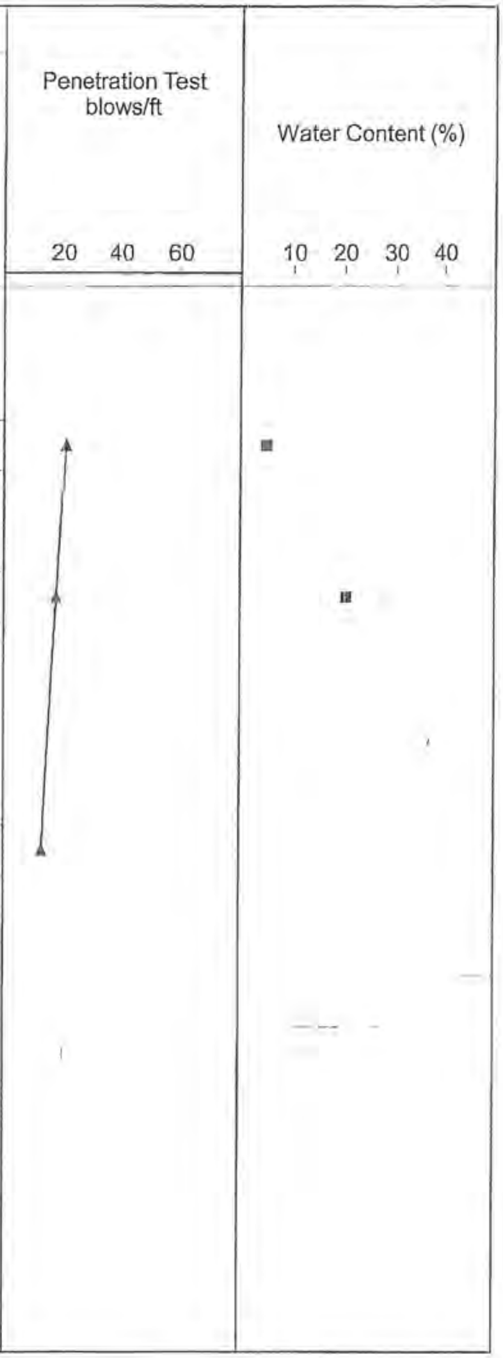
Logged By: Dave Adams

Depth to Water>

Initial: 11 Feet

At Completion: 11 Feet

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2		Medium dense below 2½ feet	121.1	5.0	■	21
4						
		SAND (SP) Medium dense, fine- to medium-grained; brown, damp, drills easily	107.8	20.4	■	18
6						
8		***SANDY SILTY CLAY (CL)*** Stiff, fine- to medium-grained; brown, very moist, drills easily				
10		▽ Saturated below 11 feet			■	13
12		***SAND (SP)*** Medium dense, fine- to medium-grained; brown, saturated, drills easily				
14						
16						
18						
20						



Drill Method: Solid Flight

Drill Rig: CME 45C-3

Driller: Jim Watts

Krazan and Associates

Drill Date: 2-2-18

Hole Size: 4½ Inches

Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B8

Project: Tract 848

Project No: 012-18019

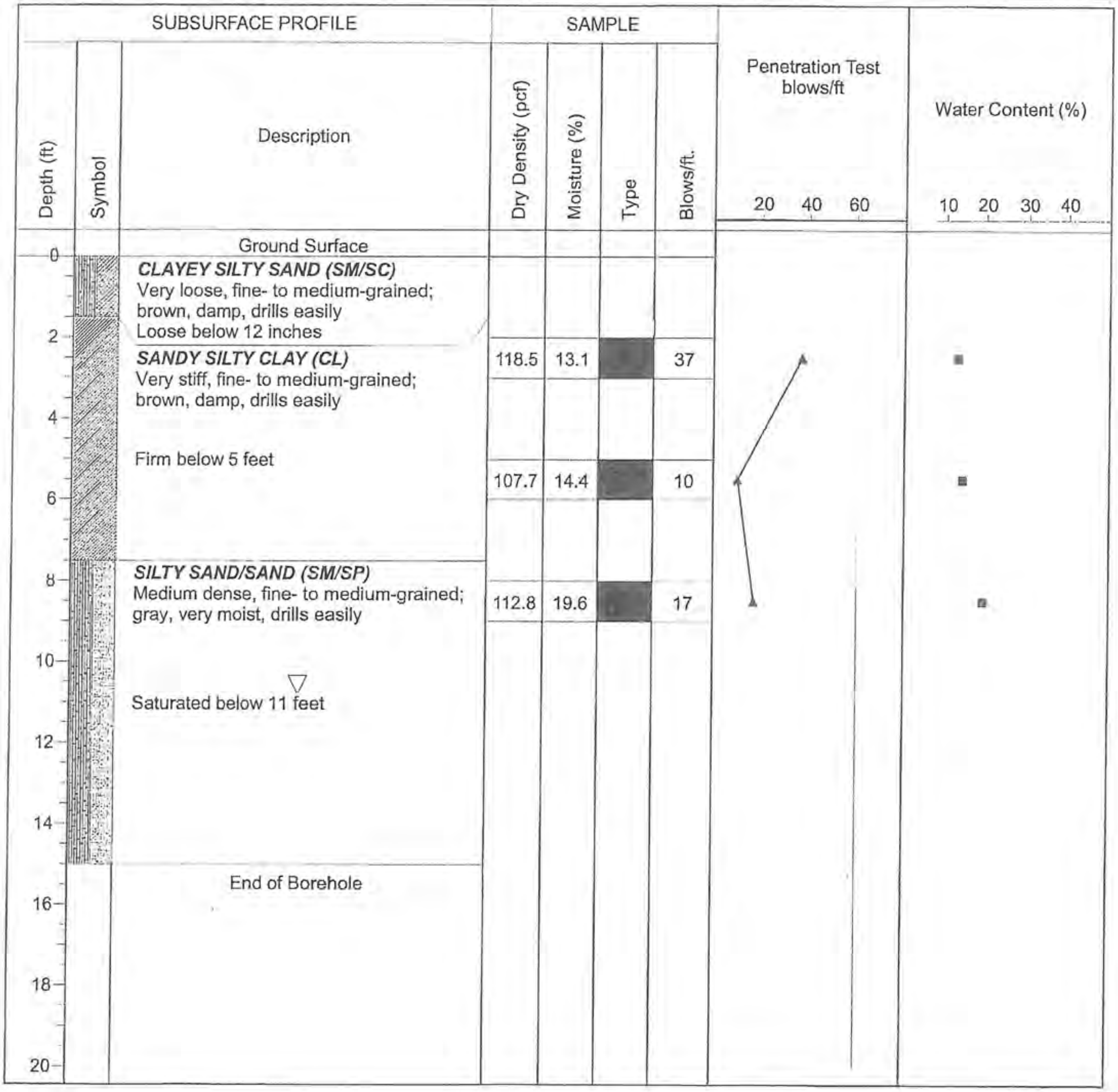
Client: Lennar Homes of California

Figure No.: A-8

Location: Bush Street and Pederson Street, Lemoore, CA

Logged By: Dave Adams

Depth to Water> **Initial:** 11 Feet **At Completion:** 11 Feet



Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
Ground Surface				
CLAYEY SILTY SAND (SM/SC) Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
SANDY SILTY CLAY (CL) Very stiff, fine- to medium-grained; brown, damp, drills easily	118.5	13.1	■	37
Firm below 5 feet	107.7	14.4	■	10
SILTY SAND/SAND (SM/SP) Medium dense, fine- to medium-grained; gray, very moist, drills easily	112.8	19.6	■	17
Saturated below 11 feet				
End of Borehole				

Drill Method: Solid Flight

Drill Date: 2-2-18

Drill Rig: CME 45C-3

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 15 Feet

Sheet: 1 of 1

Log of Boring B9

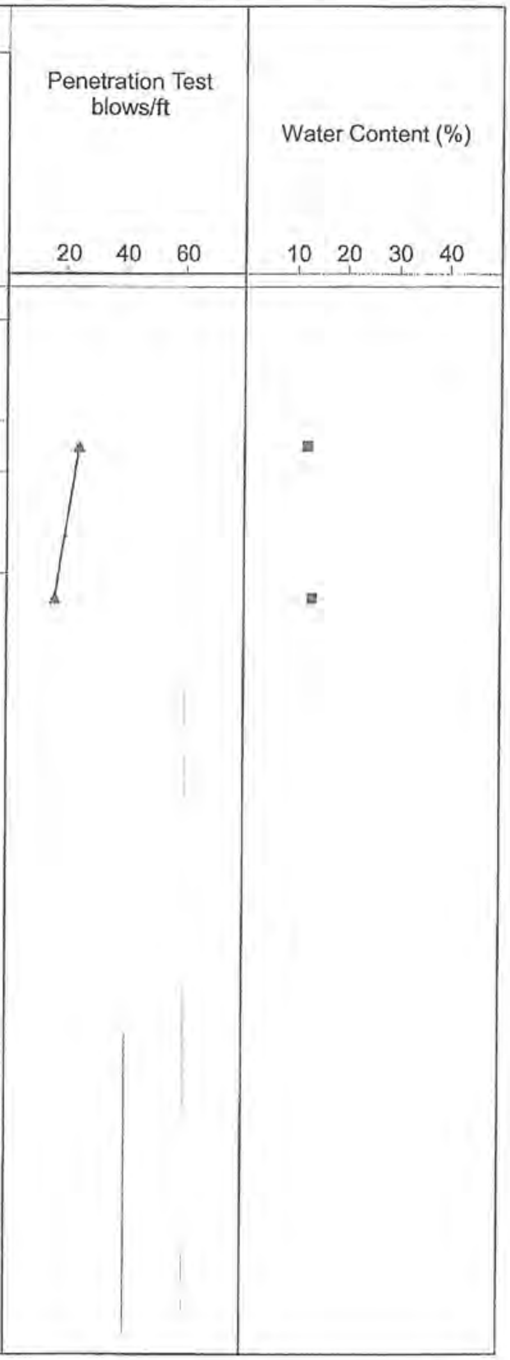
Project: Tract 848
Project No: 012-18019

Client: Lennar Homes of California
Figure No.: A-9

Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: Dave Adams

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily Loose below 12 inches				
2	▨	***SANDY SILTY CLAY (CL)*** Very stiff, fine- to medium-grained; brown, damp, drills easily	121.6	12.2	■	24
4	▨	***SILTY SAND (SM)*** Medium dense, fine- to medium-grained; brown, moist, drills easily	114.5	13.2	■	16
10		End of Borehole				



Drill Method: Solid Flight
Drill Date: 2-2-18

Drill Rig: CME 45C-3
Hole Size: 4½ Inches

Krazan and Associates

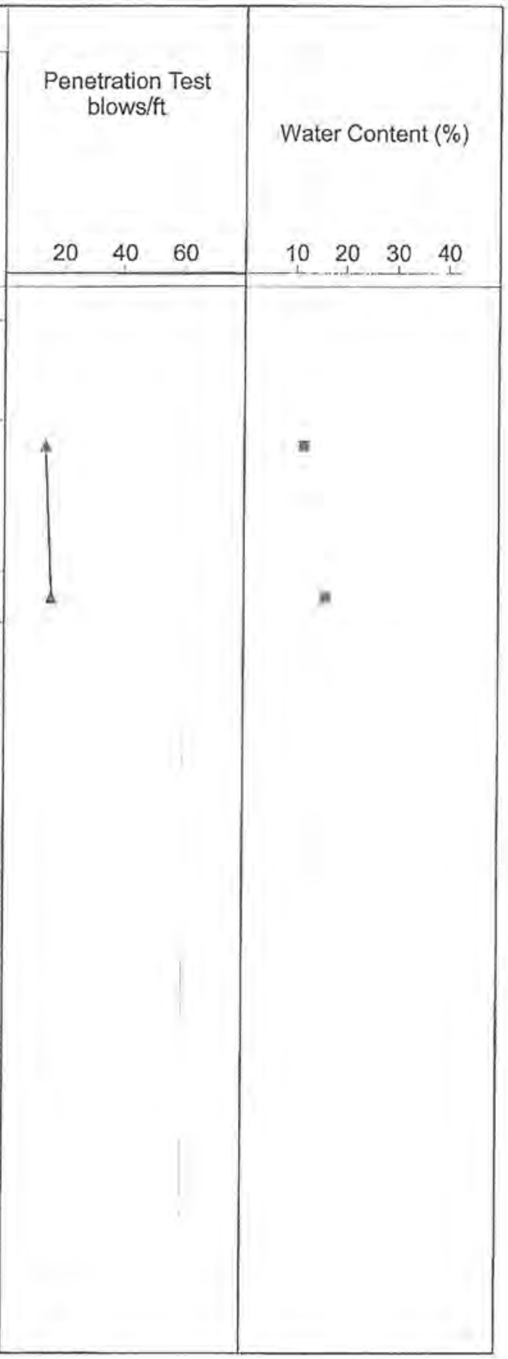
Driller: Jim Watts
Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B10

Project: Tract 848
Project No: 012-18019
Client: Lennar Homes of California
Figure No.: A-10
Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: Dave Adams
Depth to Water>
Initial: None
At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0–1.7	▨	***CLAYEY SILTY SAND (SM/SC)*** Very loose, fine- to medium-grained; brown, damp, drills easily				
1.7–4.5	▨	***SANDY SILTY CLAY (CL)*** Stiff, fine- to medium-grained with lenses of SILTY SAND; brown, damp, drills easily	121.3	11.9	■	14
4.5–10	▨	***SILTY SAND (SM)*** Medium dense, fine- to medium-grained; brown, moist, drills easily	113.2	16.1	■	16
10		End of Borehole				



Drill Method: Solid Flight
Drill Rig: CME 45C-3
Driller: Jim Watts

Krazan and Associates

Drill Date: 2-2-18
Hole Size: 4½ Inches
Elevation: 10 Feet
Sheet: 1 of 1

Log of Boring B11

Project: Tract 848

Project No: 012-18019

Client: Lennar Homes of California

Figure No.: A-11

Location: Bush Street and Pederson Street, Lemoore, CA

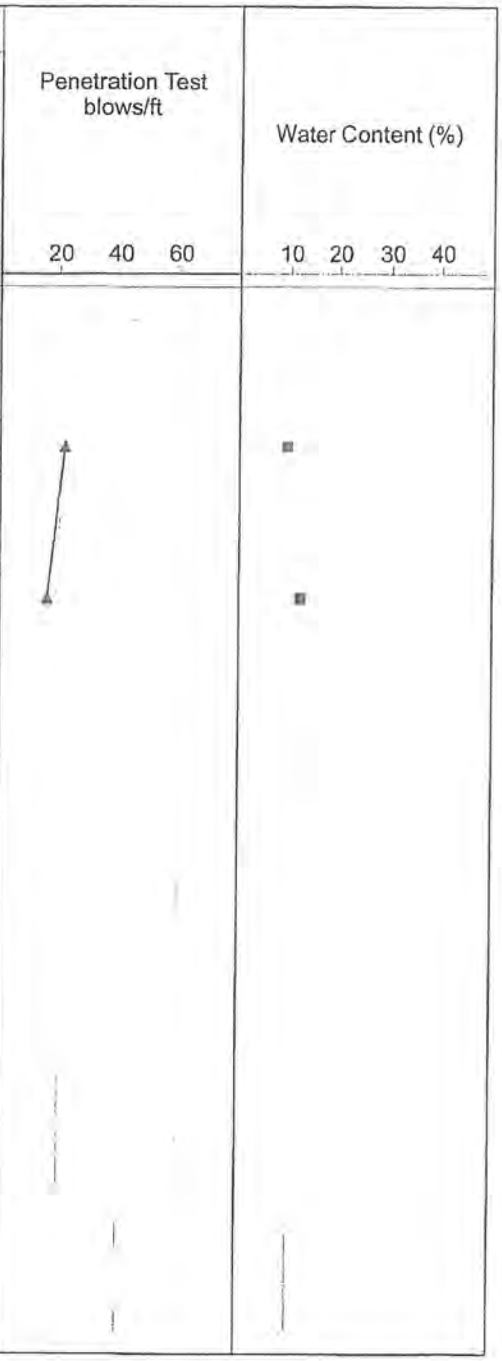
Logged By: R. Alexander

Depth to Water>

Initial: None

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▥	***SANDY SILT (ML)*** Very loose, fine- to medium-grained; light brown, damp, drills easily Loose below 12 inches				
2	▨	***SANDY CLAY (CL)*** Very stiff, fine- to medium-grained; light brown, damp, drills easily	92.6	9.5	■	22
4	▨					
	▨	Stiff below 5 feet	81.5	12.3	■	16
6	▨					
8	▨					
10		End of Borehole				
12						
14						
16						
18						
20						



Drill Method: Solid Flight

Drill Date: 3-20-18

Drill Rig: CME 45C-3

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B12

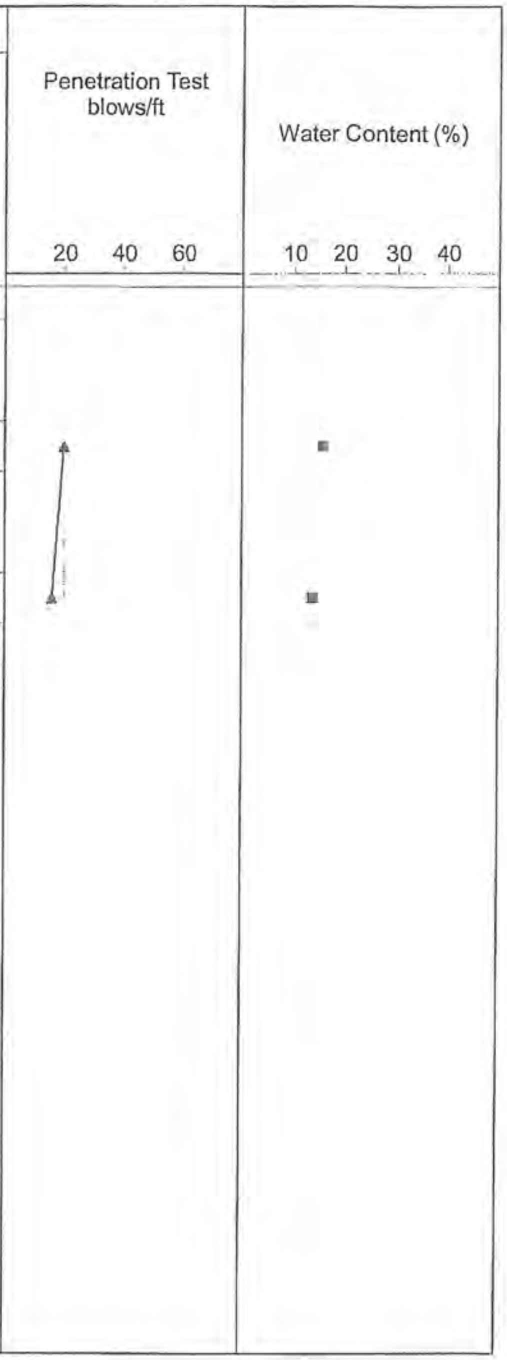
Project: Tract 848 **Project No:** 012-18019

Client: Lennar Homes of California **Figure No.:** A-12

Location: Bush Street and Pederson Street, Lemoore, CA **Logged By:** R. Alexander

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***SANDY SILT (ML)*** Very loose, fine- to medium-grained; light brown, damp, drills easily Loose below 12 inches				
2		***SILTY CLAY (CL)*** Stiff, fine- to medium-grained; grayish-brown, damp, drills easily		15.8	■	20
4						
		Light brown below 5 feet	103.2	13.9	■	16
6						
8						
10		End of Borehole				
12						
14						
16						
18						
20						



Drill Method: Solid Flight **Drill Date:** 3-20-18

Drill Rig: CME 45C-3 **Krazan and Associates** **Hole Size:** 4½ Inches

Driller: Jim Watts **Elevation:** 10 Feet

Sheet: 1 of 1

Log of Boring B13

Project: Tract 848

Project No: 012-18019

Client: Lennar Homes of California

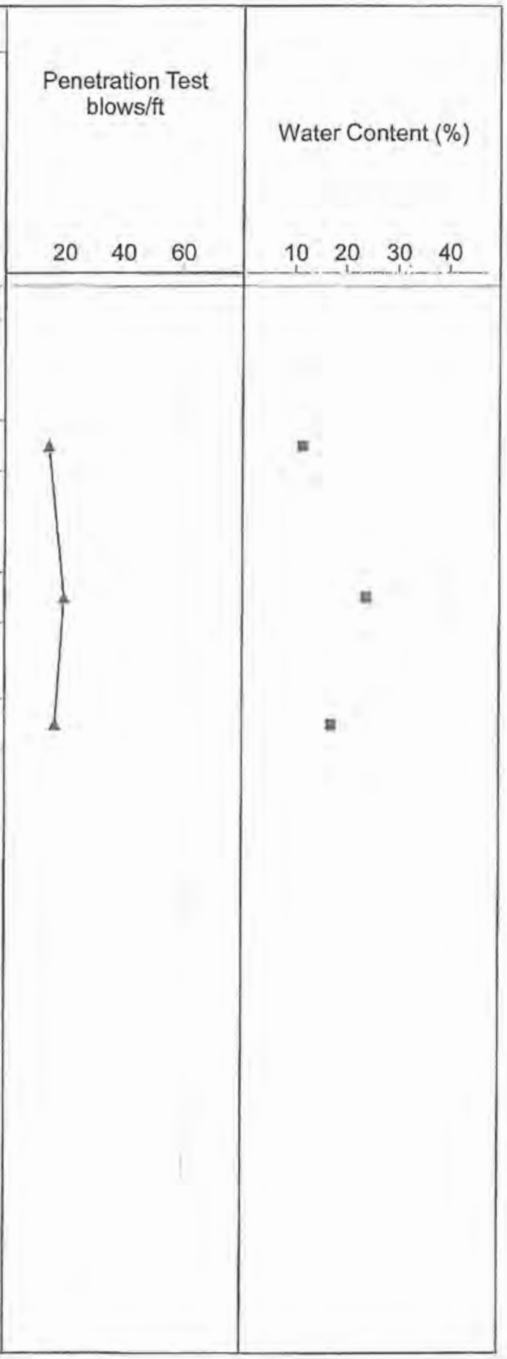
Figure No.: A-13

Location: Bush Street and Pederson Street, Lemoore, CA

Logged By: R. Alexander

Depth to Water> **Initial:** 9½ Feet **At Completion:** 9½ Feet

SUBSURFACE PROFILE	SAMPLE			
Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
Ground Surface				
SANDY SILT (ML) Very loose, fine- to medium-grained; light brown, damp, drills easily Loose below 12 inches				
SANDY CLAY (CL) Stiff, fine- to coarse-grained; light brown, damp, drills easily Fine- to medium-grained below 4 feet	114.4	11.7	■	15
	106.2	24.1	■	20
	115.1	17.3	■	17
▽				
SILTY SAND (SM) Loose, fine- to coarse-grained; tan, saturated, drills easily				
End of Borehole				



Drill Method: Solid Flight

Drill Date: 3-20-18

Drill Rig: CME 45C-3

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

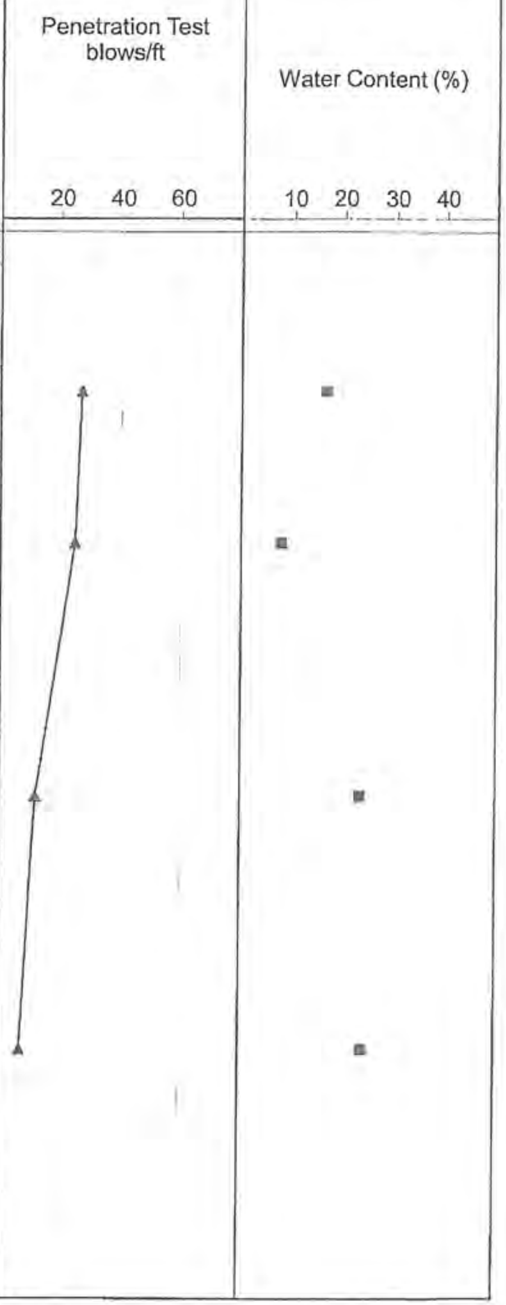
Elevation: 15 Feet

Sheet: 1 of 1

Log of Boring B14

Project: Tract 848
Project No: 012-18019
Client: Lennar Homes of California
Figure No.: A-14
Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: R. Alexander
Depth to Water> **Initial:** 9 Feet **At Completion:** 9 Feet

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
		SANDY SILT (ML) Very loose, fine- to medium-grained with trace CLAY; light brown, damp, drills easily Loose below 12 inches				
2			120.4	16.6	■	27
		SILTY SAND (SM) Medium dense, fine- to medium-grained; brown, damp, drills easily				
4						
6			121.9	7.8	■	25
8		***SANDY CLAY (CL)*** Stiff, fine- to medium-grained; light brown, damp, drills easily ▽				
10		***SAND (SP)*** Loose, fine- to coarse-grained; tan, saturated, drills easily	71.3	23.5	■	12
12						
14						
16			74.8	24.1	■	7
18						
20						



Drill Method: Solid Flight
Drill Date: 3-20-18
Drill Rig: CME 45C-3
Krazan and Associates
Hole Size: 4½ Inches
Driller: Jim Watts
Elevation: 20 Feet
Sheet: 1 of 1

Log of Boring B15

Project: Tract 848

Client: Lennar Homes of California

Location: Bush Street and Pederson Street, Lemoore, CA

Depth to Water> **Initial:** None

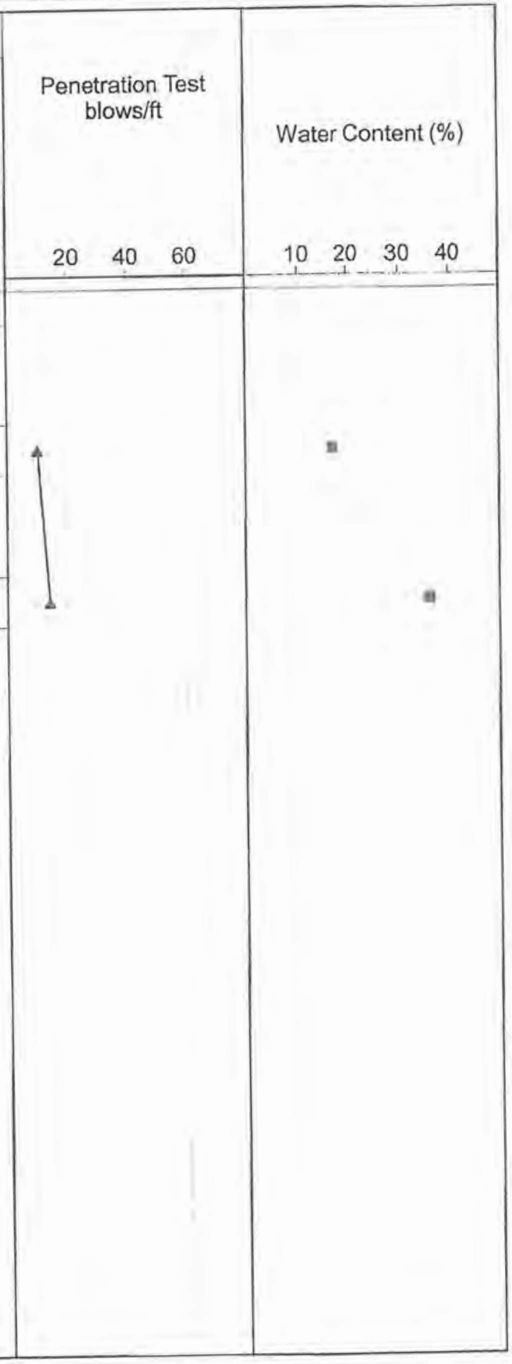
Project No: 012-18019

Figure No.: A-15

Logged By: R. Alexander

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***SANDY SILT (ML)*** Very loose, fine- to medium-grained with trace CLAY; light brown, damp, drills easily Loose below 12 inches	108.6	17.1	■	10
		SILTY SAND (SM) Loose, fine- to medium-grained; brown, damp, drills easily				
4		***SANDY CLAY (CL)*** Stiff, fine- to medium-grained; brown, damp, drills easily	91.3	36.2	■	14
		Light brown below 8½ feet				
10		End of Borehole				



Drill Method: Solid Flight

Drill Rig: CME 45C-3

Driller: Jim Watts

Krazan and Associates

Drill Date: 3-20-18

Hole Size: 4½ Inches

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B16

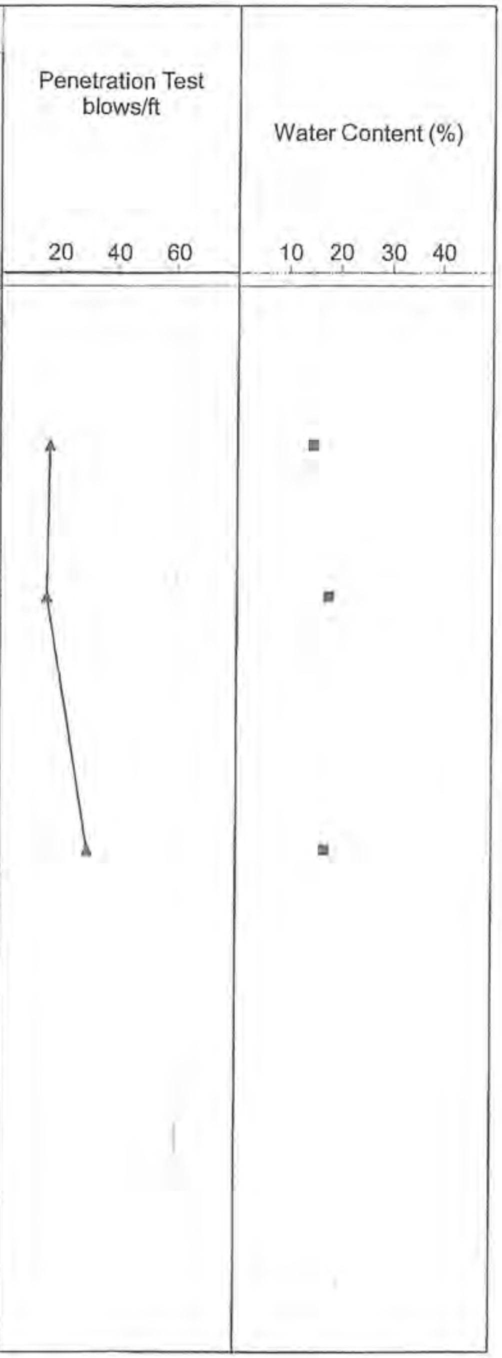
Project: Tract 848
Project No: 012-18019

Client: Lennar Homes of California
Figure No.: A-16

Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: R. Alexander

Depth to Water>
Initial: 9 Feet
At Completion: 9 Feet

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0		***SANDY SILT (ML)*** Very loose, fine- to medium-grained; light brown, damp, drills easily				
2		***SILTY CLAY (CL)*** Stiff, fine- to medium-grained; brown, damp, drills easily	115.4	14.9	■	17
4				17.9	■	16
6		***SANDY CLAY (CL)*** Stiff, fine- to medium-grained; light brown, damp, drills easily Gray and moist below 8½ feet Saturated below 9 feet				
10		***SILTY SAND (SM)*** Medium dense, fine- to coarse-grained; tan, saturated, drills easily	112.5	17.1	■	30
14		End of Borehole				
16						
18						
20						



Drill Method: Solid Flight
Drill Date: 3-20-18

Drill Rig: CME 45C-3
Krazan and Associates
Hole Size: 4½ Inches

Driller: Jim Watts
Elevation: 15 Feet
Sheet: 1 of 1

Log of Boring B17

Project: Tract 848

Project No: 012-18019

Client: Lennar Homes of California

Figure No.: A-17

Location: Bush Street and Pederson Street, Lemoore, CA

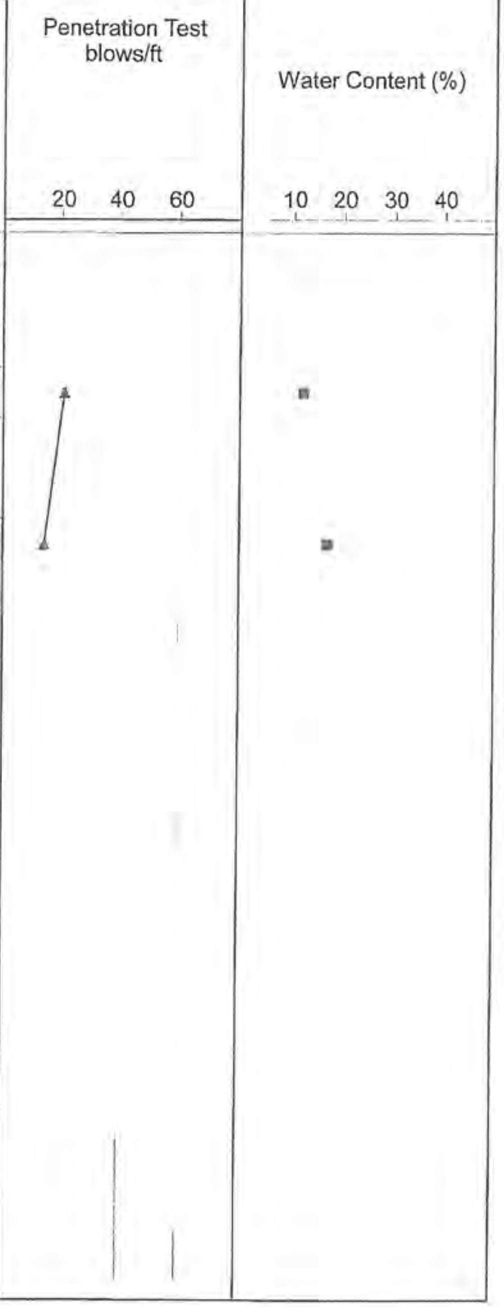
Logged By: R. Alexander

Depth to Water>

Initial: None

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
	▥	***SANDY SILT (ML)*** Very loose, fine- to medium-grained with trace CLAY; light brown, damp, drills easily Loose below 12 inches				
	▨	***SANDY CLAY (CL)*** Very stiff, fine- to medium-grained; brown, damp, drills easily	82.1	12.2	■	21
	▨	Stiff and light brown below 5 feet	113.1	17.0	■	14
10		End of Borehole				



Drill Method: Solid Flight

Drill Date: 3-20-18

Drill Rig: CME 45C-3

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 10 Feet

Sheet: 1 of 1

Log of Boring B18

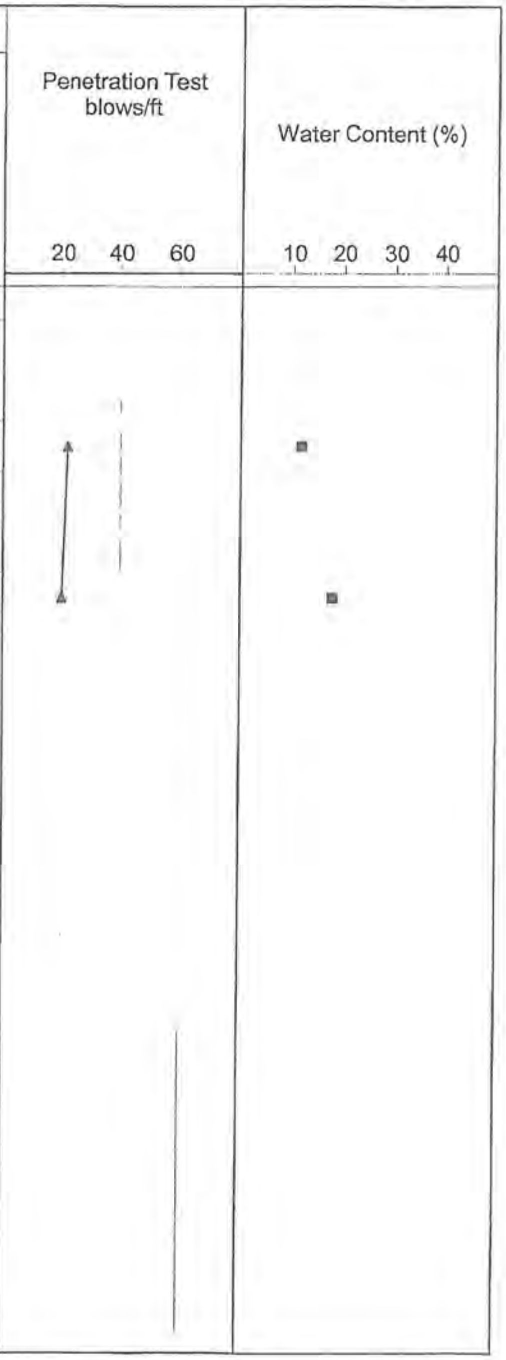
Project: Tract 848
Project No: 012-18019

Client: Lennar Homes of California
Figure No.: A-18

Location: Bush Street and Pederson Street, Lemoore, CA
Logged By: R. Alexander

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▥	***SANDY SILT (ML)*** Very loose, fine- to medium-grained with trace CLAY; light brown, damp, drills easily				
2	▨	***SANDY CLAY (CL)*** Very stiff, fine- to medium-grained; light brown, damp, drills easily	120.8	11.9	■	22
4	▨	Stiff and light gray below 4½ feet				
6	▨		113.4	18.0	■	20
8	▨	Light brown below 5 feet				
10		End of Borehole				
12						
14						
16						
18						
20						



Drill Method: Solid Flight
Drill Date: 3-20-18

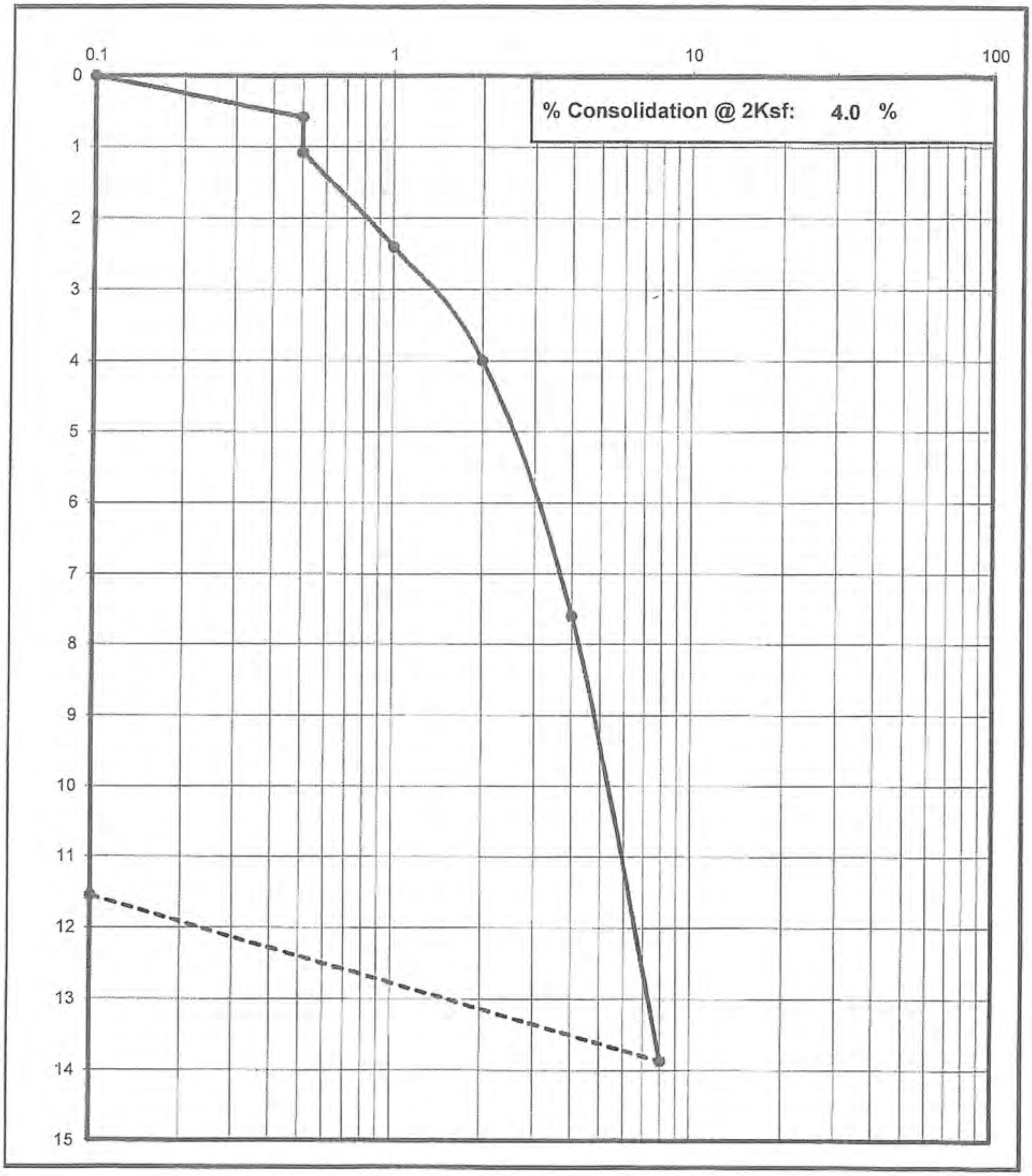
Drill Rig: CME 45C-3
Krazan and Associates
Hole Size: 4½ Inches

Driller: Jim Watts
Elevation: 10 Feet

Sheet: 1 of 1

Consolidation Test

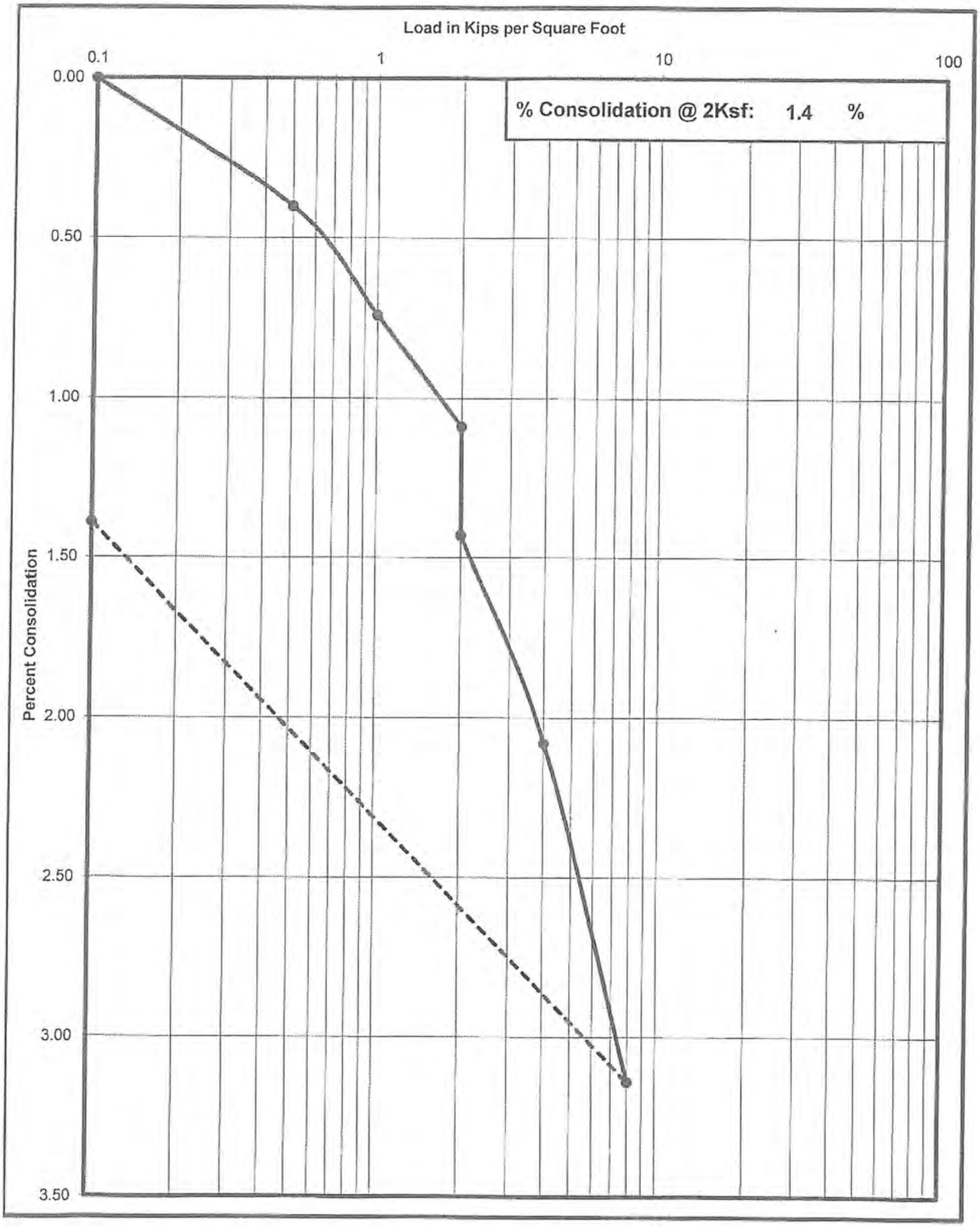
Project No	Boring No. & Depth	Date	Soil Classification
012-18019	B2 @ 2-3'	2/26/2018	CL



Krazan Testing Laboratory

Consolidation Test

Project No	Boring No. & Depth	Date	Soil Classification
012-18019	B10 @ 2-3'	2/26/2018	SM

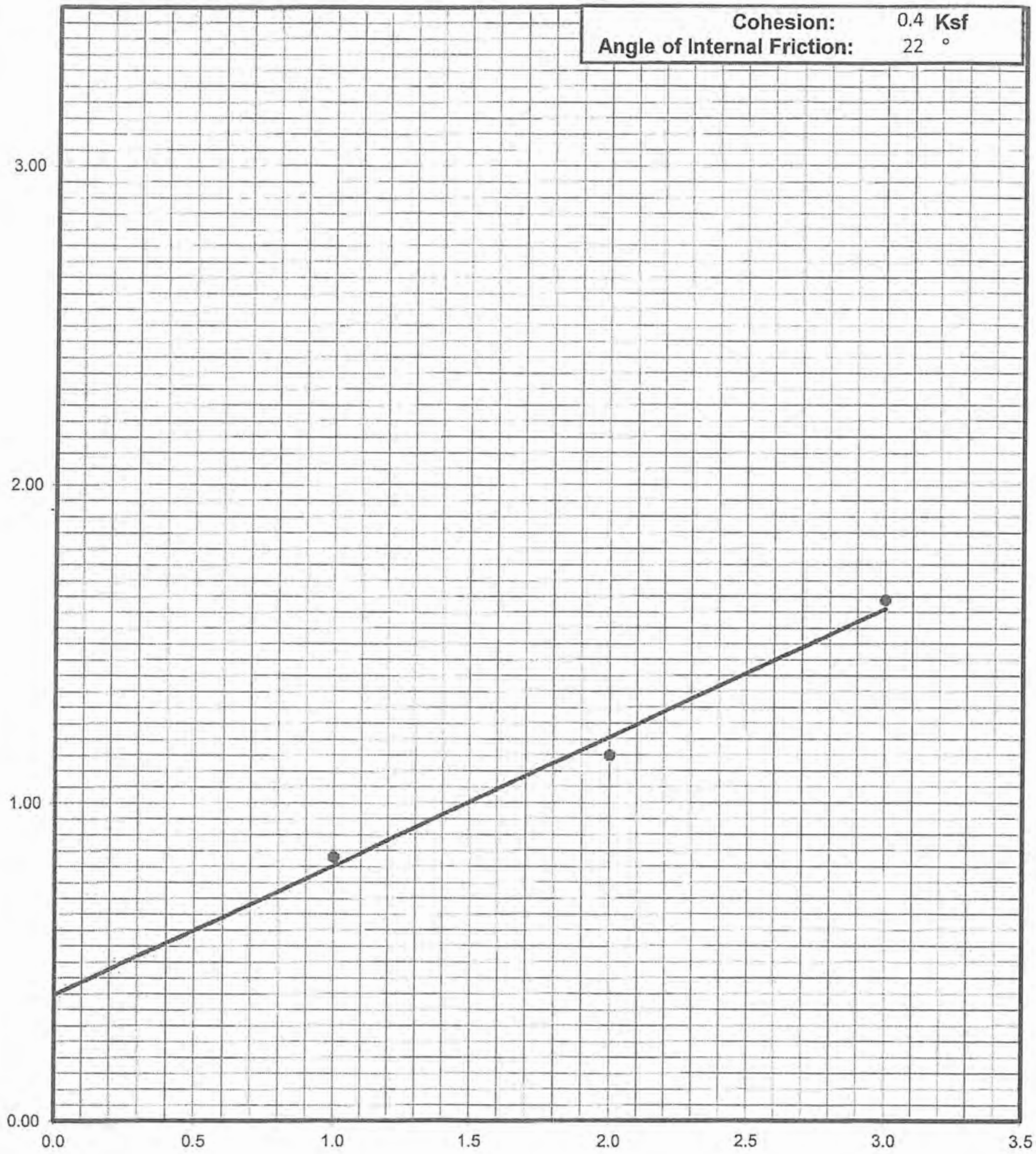


Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)

ASTM D - 3080 / AASHTO T - 236

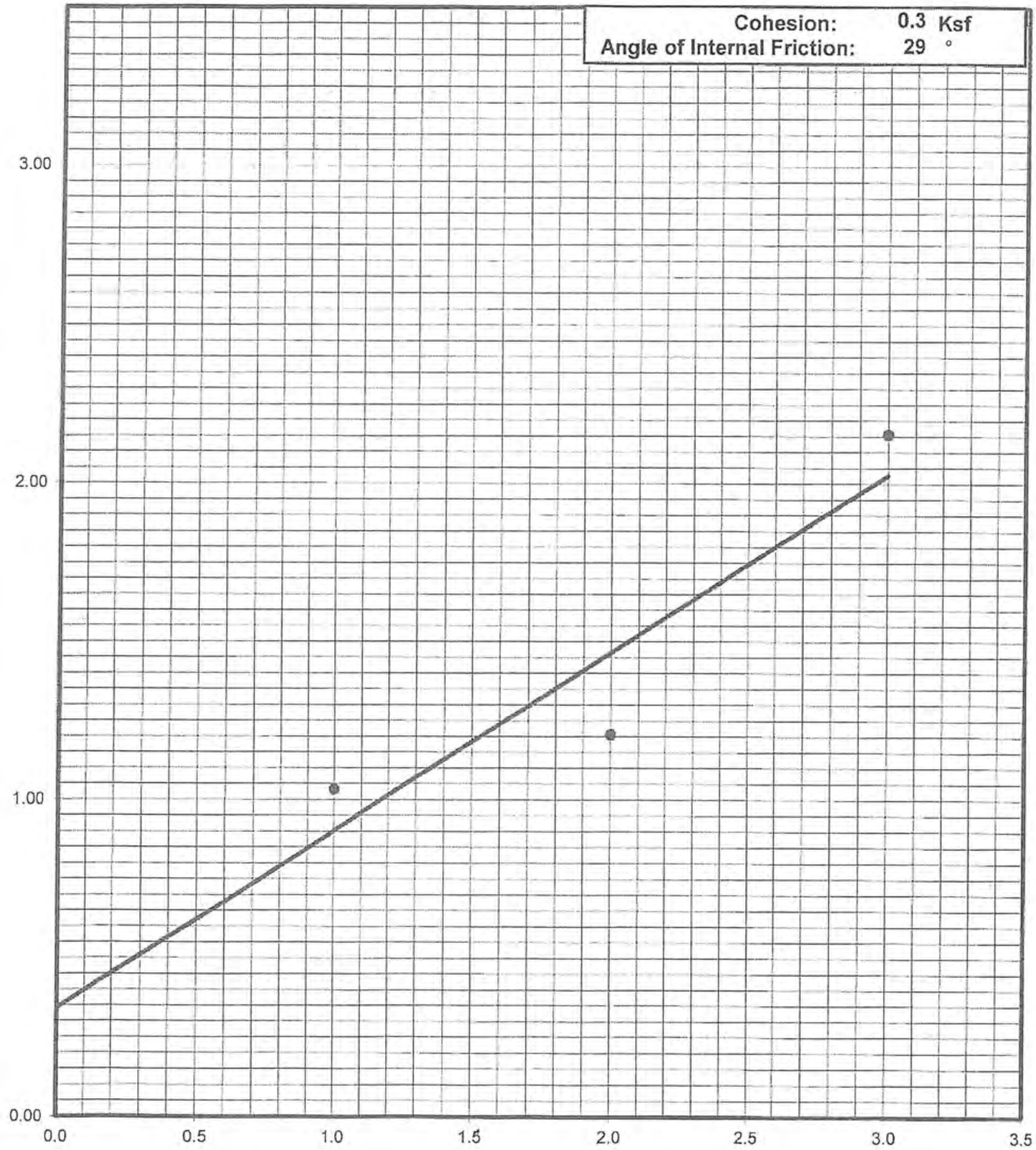
Project Number	Boring No. & Depth	Soil Type	Date
012-18019	B3 @ 5-6'	CL	2/26/2018



Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
012-18019	B5 @ 2-3'	CL	2/26/2018



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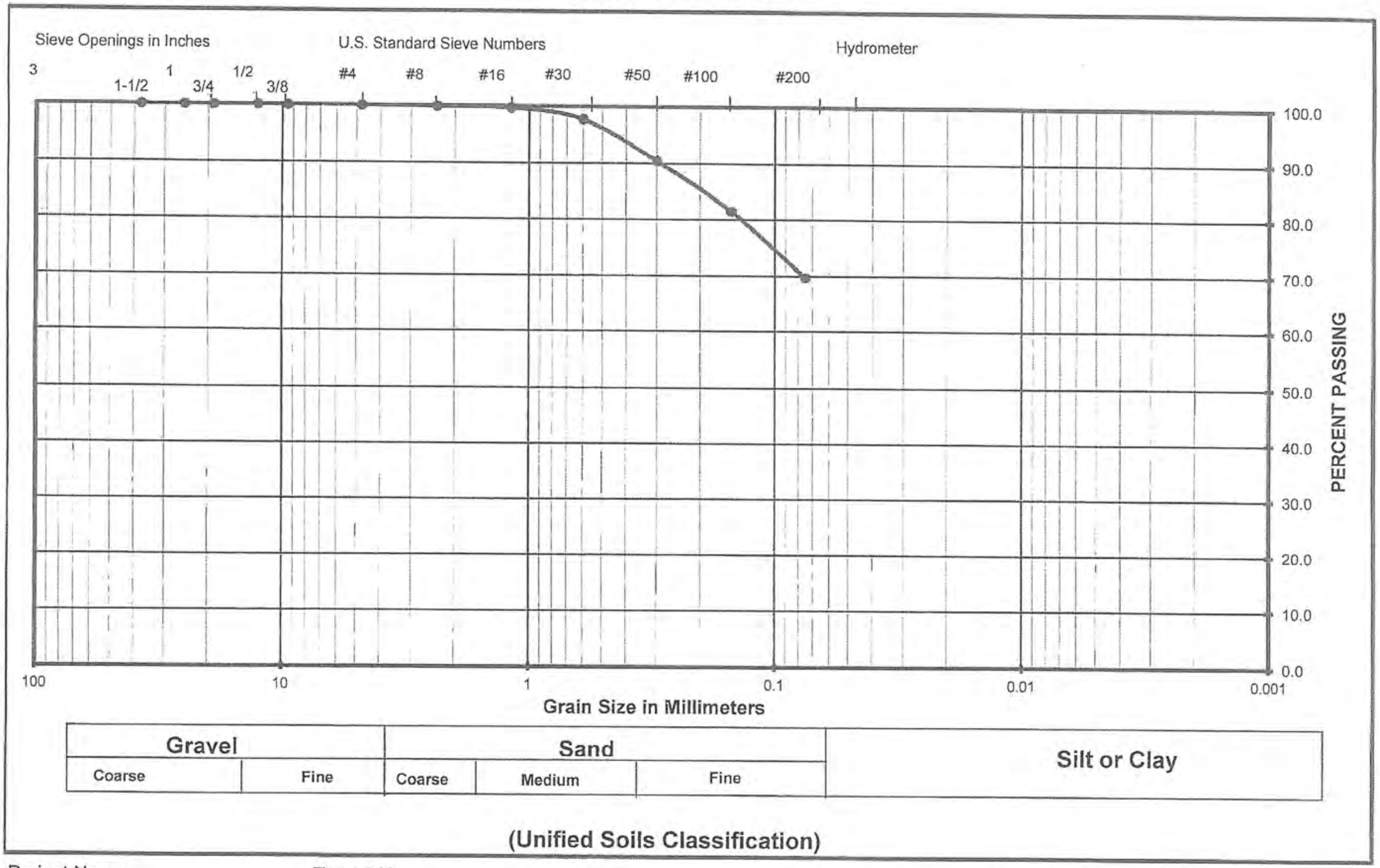
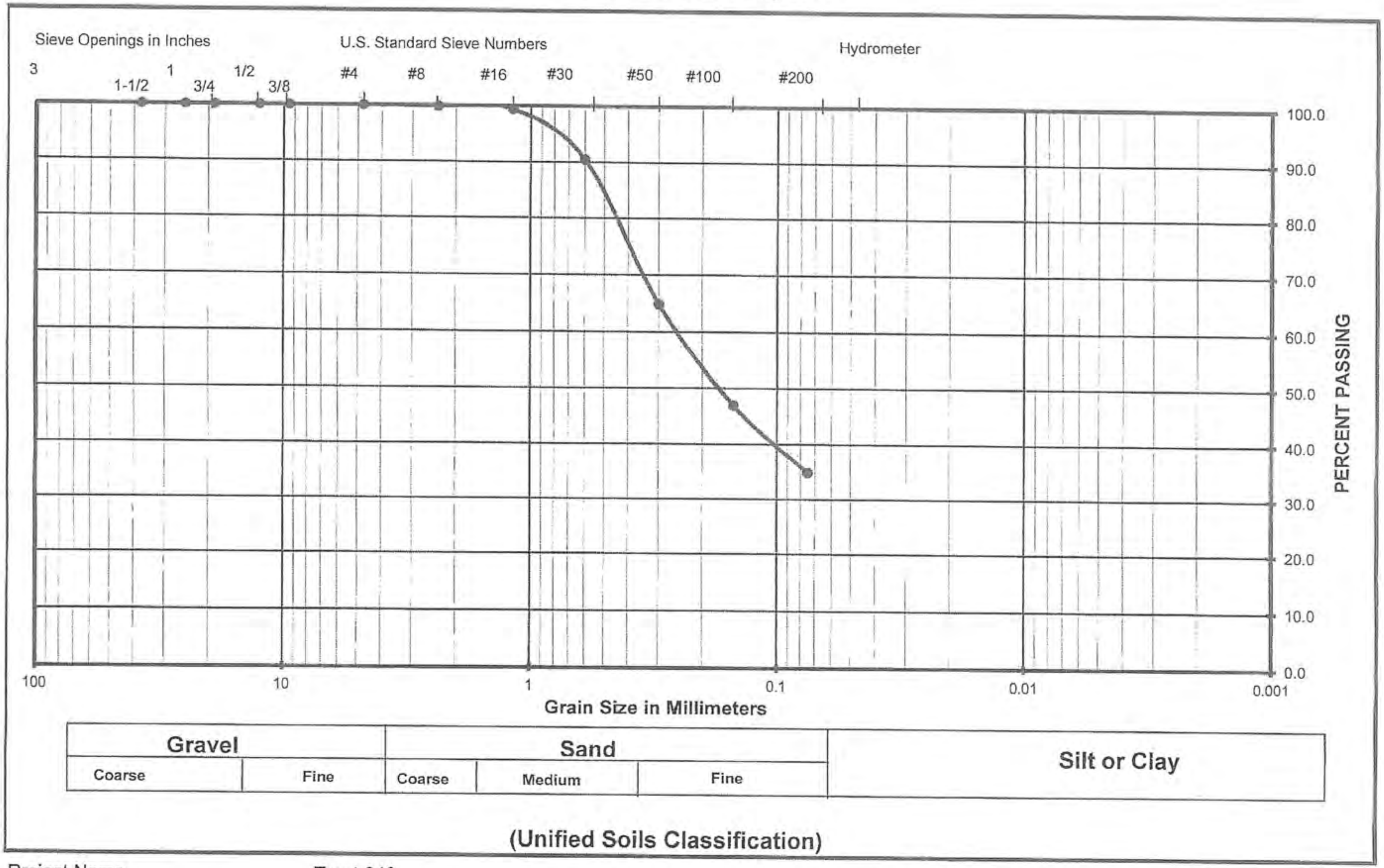
Grain Size Analysis



Project Name	Tract 848
Project Number	012-18019
Soil Classification	CL
Sample Number	B2 @ 2-3'

Krazan Testing Laboratory

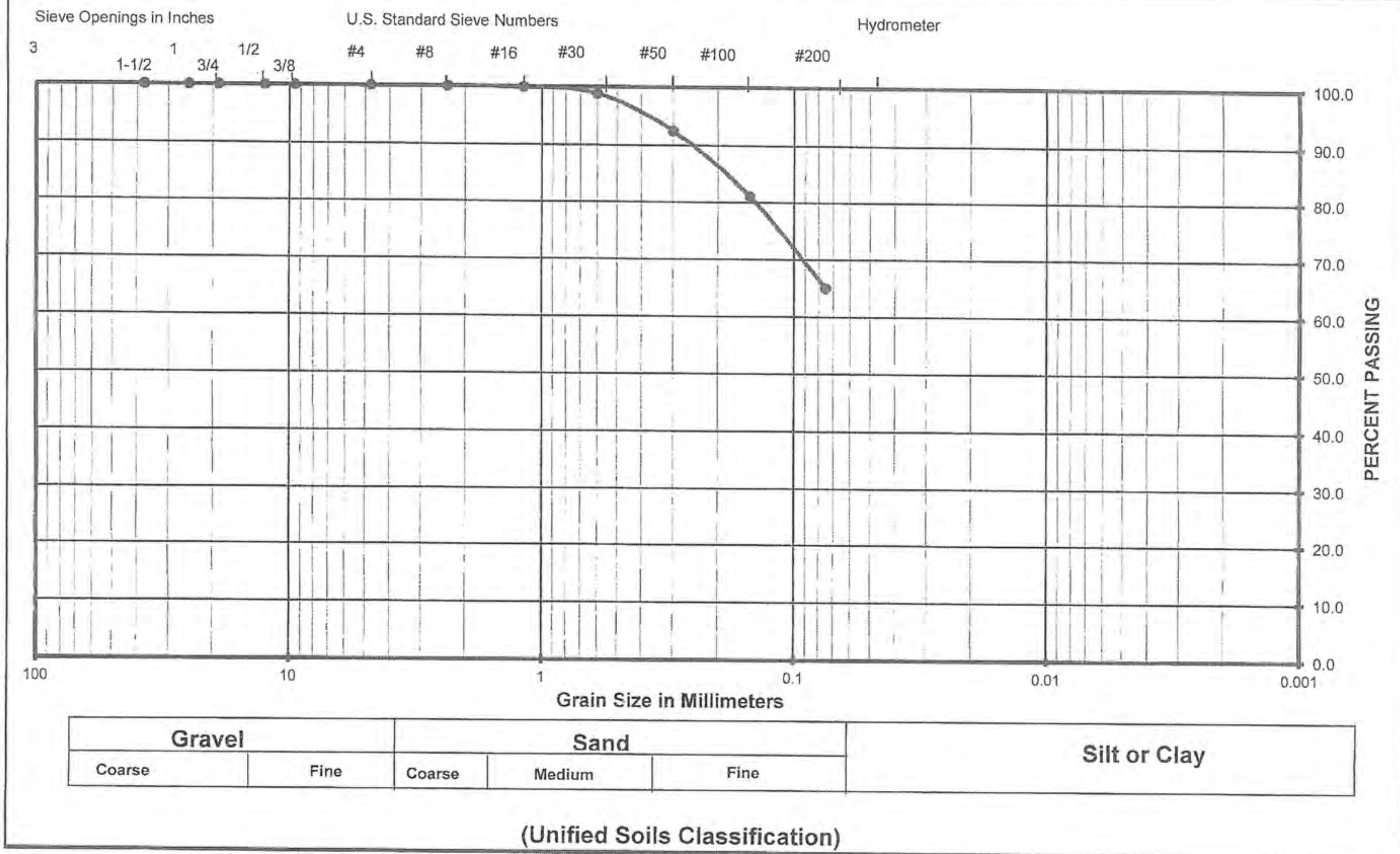
Grain Size Analysis



Project Name	Tract 848
Project Number	012-18019
Soil Classification	SM
Sample Number	B10 @ 2-3'

Krazan Testing Laboratory

Grain Size Analysis



Project Name	Tract 848
Project Number	012-18019
Soil Classification	CL
Sample Number	B11 @ 2-3'

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829/ UBC Std. 18-2

Project Number : 012-18019
Project Name : Tract 848
Date : 2/26/2018
Sample location/ Depth : 3-4'
Sample Number : X1
Soil Classification : CL

Trial #	1	2	3
Weight of Soil & Mold, gms	763.3		
Weight of Mold, gms	368.7		
Weight of Soil, gms	394.6		
Wet Density, Lbs/cu.ft.	119.0		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	271.9		
Moisture Content, %	10.3		
Dry Density, Lbs/cu.ft.	107.9		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	49.6		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0897

Expansion Index $_{\text{measured}}$ = 89.7

Expansion Index = 90

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829/ UBC Std. 18-2

Project Number	: 012-18019
Project Name	: Tract 848
Date	: 2/26/2018
Sample location/ Depth	: 1-3'
Sample Number	: RV#1
Soil Classification	: CL

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	568.0		
Weight of Mold, gms	184.7		
Weight of Soil, gms	383.3		
Wet Density, Lbs/cu.ft.	115.6		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	267.4		
Moisture Content, %	12.2		
Dry Density, Lbs/cu.ft.	103.0		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	51.8		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0891

Expansion Index $_{\text{measured}}$ = 89.1

Expansion Index = 89

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829/ UBC Std. 18-2

Project Number	: 012-18019
Project Name	: Tract 848
Date	: 2/26/2018
Sample location/ Depth	: 1-3'
Sample Number	: RV#4
Soil Classification	: CL

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	564.3		
Weight of Mold, gms	183.4		
Weight of Soil, gms	380.9		
Wet Density, Lbs/cu.ft.	114.9		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	266.9		
Moisture Content, %	12.4		
Dry Density, Lbs/cu.ft.	102.2		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	51.6		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.072

Expansion Index $_{\text{measured}}$ = 72

Expansion Index = 72

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829/ UBC Std. 18-2

Project Number	: 012-18019
Project Name	: Tract 848
Date	: 3/27/2018
Sample location/ Depth	: 0-1'
Sample Number	: BS-1
Soil Classification	: ML

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	582.0		
Weight of Mold, gms	184.5		
Weight of Soil, gms	397.5		
Wet Density, Lbs/cu.ft.	119.9		
Weight of Moisture Sample (Wet), gms	300.0		
Weight of Moisture Sample (Dry), gms	271.7		
Moisture Content, %	10.4		
Dry Density, Lbs/cu.ft.	108.6		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	51.0		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0314

Expansion Index $_{\text{measured}}$ = 31.4

Expansion Index = 31

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

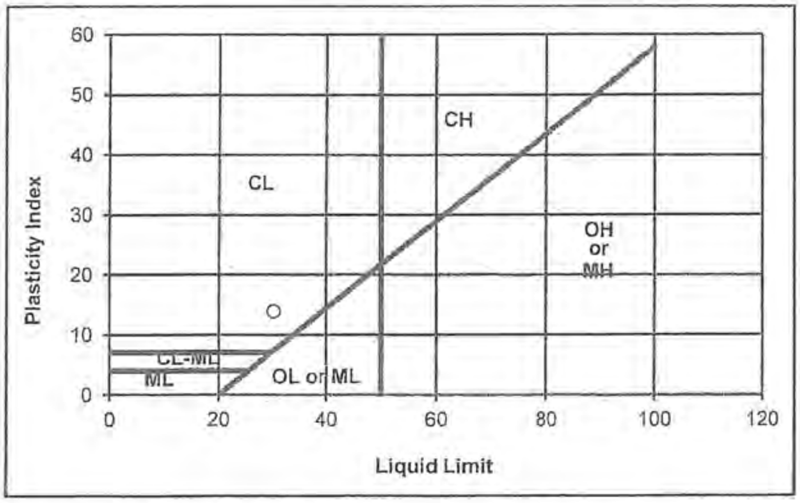
Project: **Tract 848**
Project Number: **012-18019**
Date Sampled: 3/20/2018
Sampled By: RA
Sample Number: -
Sample Location: B11 @ 2-3'
Sample Description: CL

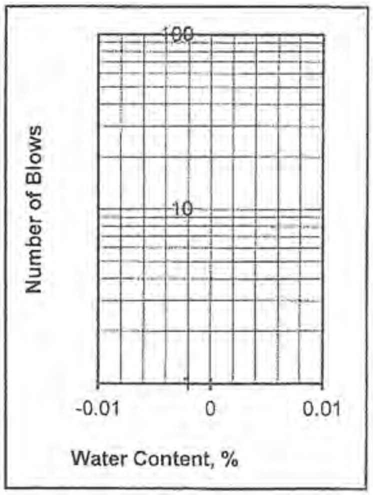
Date Tested: 3/26/2018
Tested By: J Mitchell
Verified By: J Gruszczynski

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	27.59	30.13		31.86		
Weight of Dry Soil & Tare (g)	26.13	27.86		27.96		
Weight of Tare (g)	16.99	14.39		15.06		
Weight of water (g)	1.45	2.27		3.90		
Weight of Dry Soil (g)	9.14	13.47		12.91		
Water Content (% of dry wt.)	15.9%	16.8%		30.2%		
Number of Blows				25		

Plastic Limit : 16
Liquid Limit : 30

Plasticity Index : 14
Unified Soil Classification : CL
Requirement:
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

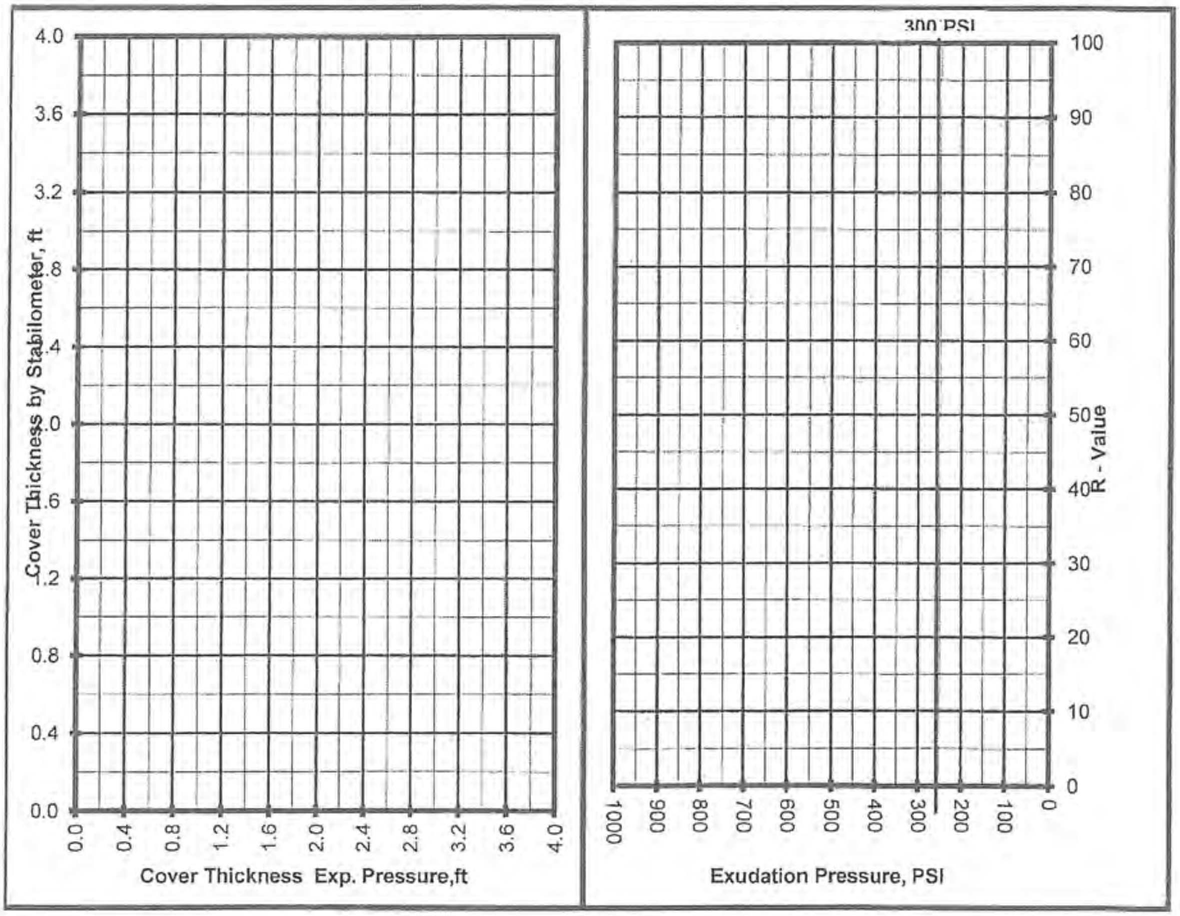
Unusual Conditions, Other Notes:

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	**012-18019**
Project Name	:	**Tract 848**
Date	:	**2/9/2018**
Sample Location/Curve Number	:	**RV#1**
Soil Classification	:	**CL**

TEST	A	B	C
Percent Moisture @ Compaction, %			
Dry Density, lbm/cu.ft.	R - Value less than 5		
Exudation Pressure, psi	Sample Exuded from bottom of Mold		
Expansion Pressure, (Dial Reading)	During test		
Expansion Pressure, psf			
Resistance Value R			

R - Value at 300 PSI Exudation Pressure	< 5
R - Value by Expansion Pressure	

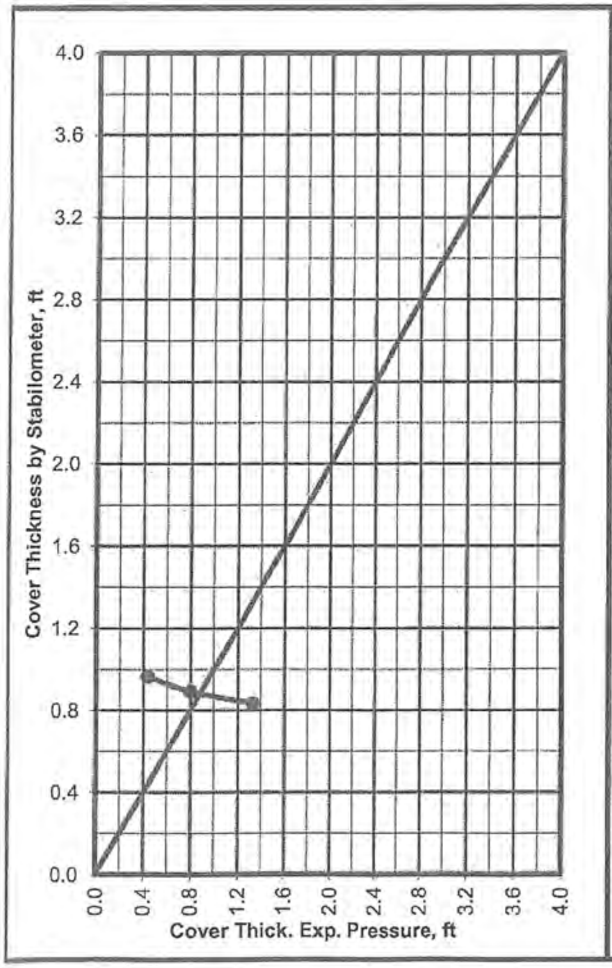


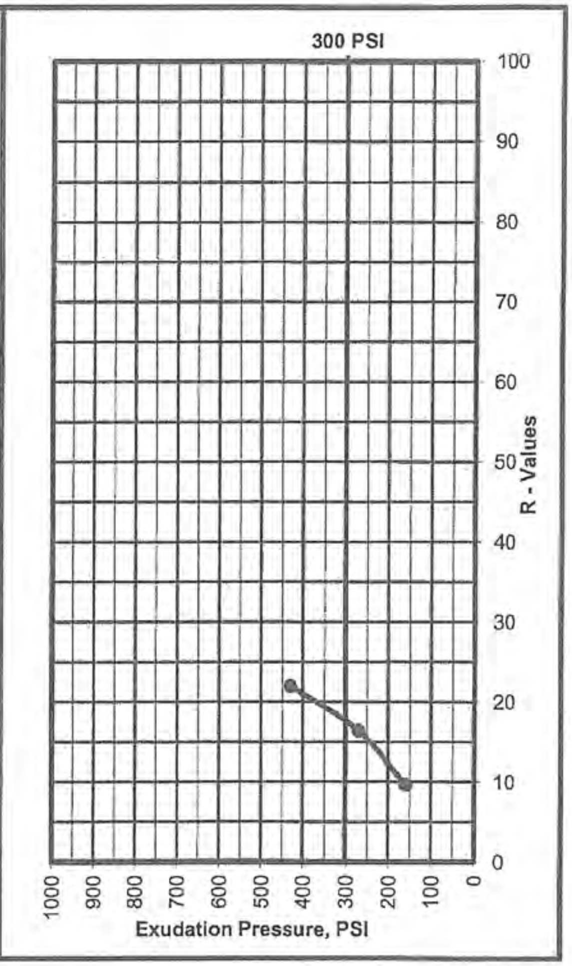
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 012-18019
Project Name : Tract 848
Date : 2/7/2018
Sample Location/Curve Number : RV#2
Soil Classification : SC/CL

TEST	A	B	C
Percent Moisture @ Compaction, %	20.5	21.7	22.2
Dry Density, lbm/cu.ft.	105.6	102.1	100.8
Exudation Pressure, psi	430	270	160
Expansion Pressure, (Dial Reading)	40	24	13
Expansion Pressure, psf	173	104	56
Resistance Value R	22	16	10

R Value at 300 PSI Exudation Pressure	17
R Value by Expansion Pressure (TI =): 5	18





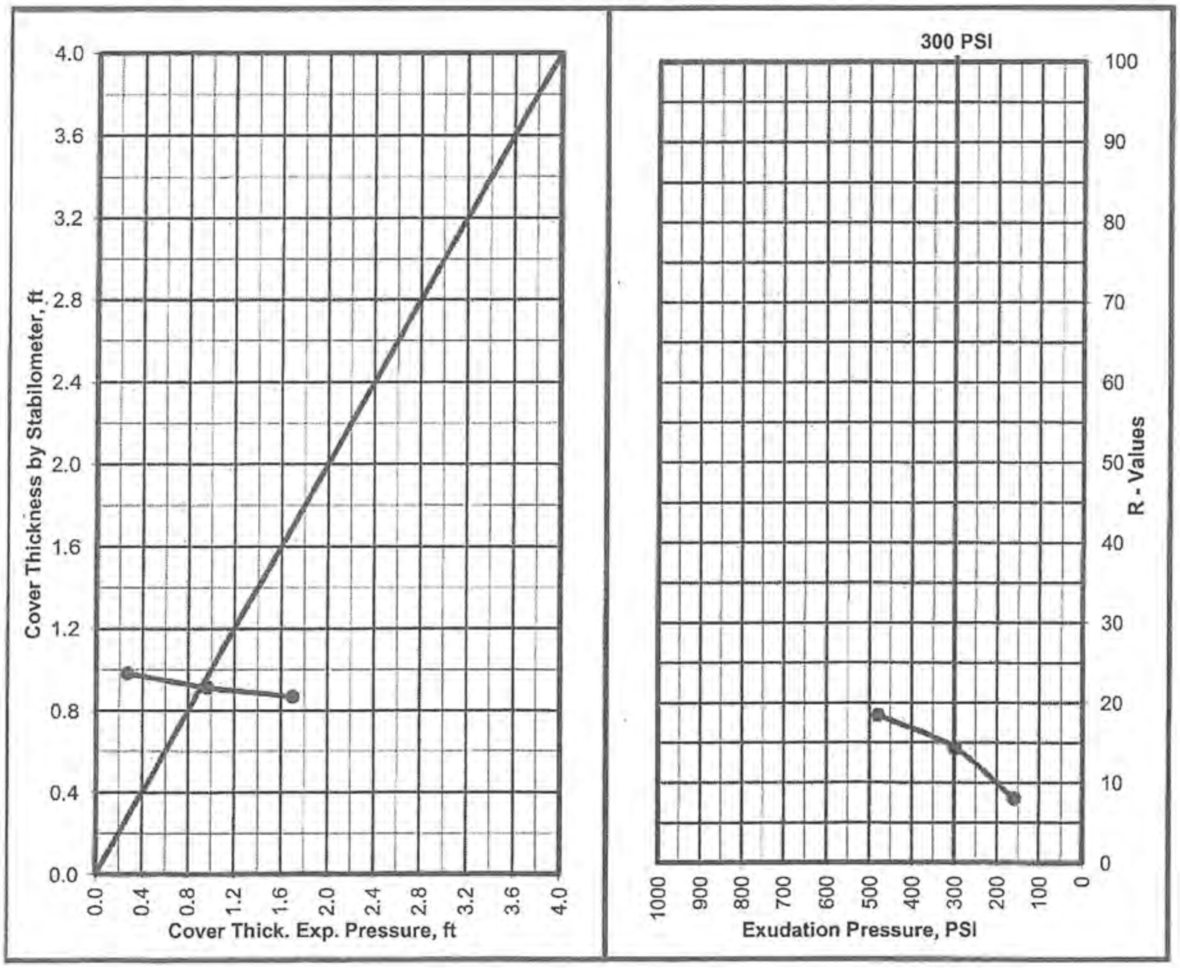
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 012-18019
Project Name : Tract 848
Date : 2/7/2018
Sample Location/Curve Number : RV#3
Soil Classification : SC/CL

TEST	A	B	C
Percent Moisture @ Compaction, %	20.6	21.4	19.7
Dry Density, lbm/cu.ft.	100.0	98.1	102.1
Exudation Pressure, psi	300	160	480
Expansion Pressure, (Dial Reading)	29	8	51
Expansion Pressure, psf	126	35	221
Resistance Value R	14	8	18

R Value at 300 PSI Exudation Pressure	14
R Value by Expansion Pressure (TI =): 5	16



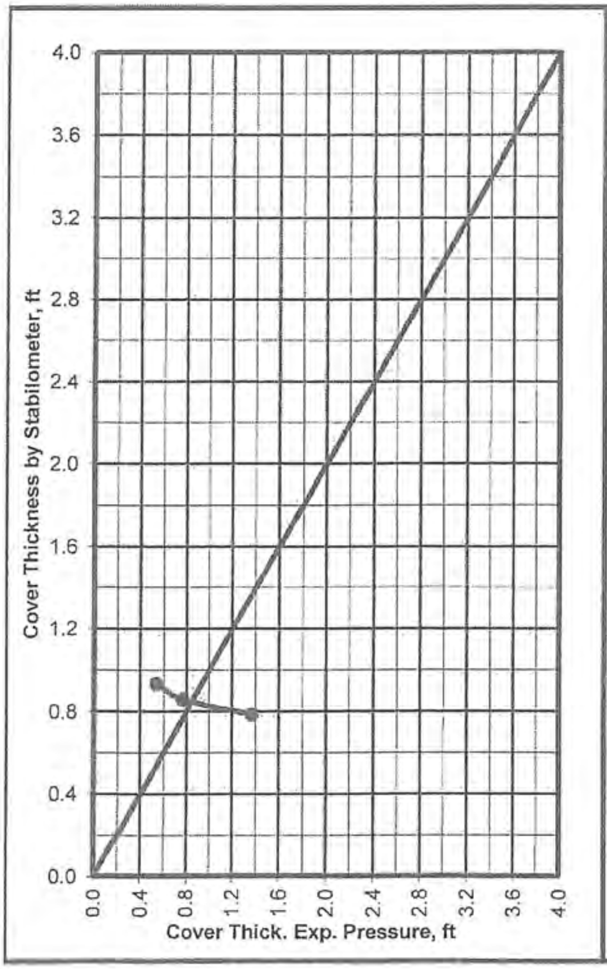
Krazan Testing Laboratory

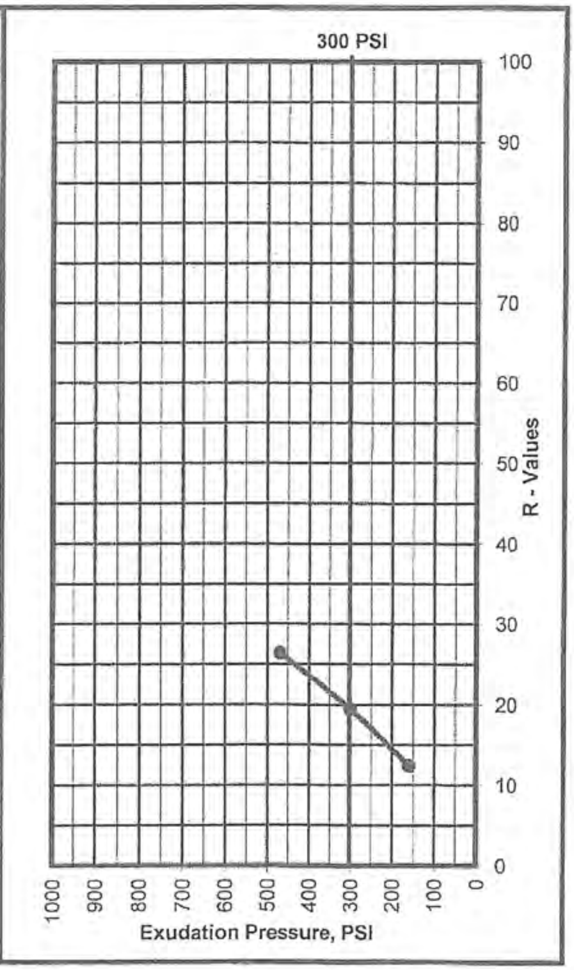
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	012-18019
Project Name	:	Tract 848
Date	:	2/7/2018
Sample Location/Curve Number	:	RV#4
Soil Classification	:	SC/CL

TEST	A	B	C
Percent Moisture @ Compaction, %	13.7	14.5	13.2
Dry Density, lbm/cu.ft.	109.2	107.1	110.6
Exudation Pressure, psi	300	160	470
Expansion Pressure, (Dial Reading)	23	16	41
Expansion Pressure, psf	100	69	178
Resistance Value R	19	12	26

R Value at 300 PSI Exudation Pressure	**20**
R Value by Expansion Pressure (TI =): 5	**23**





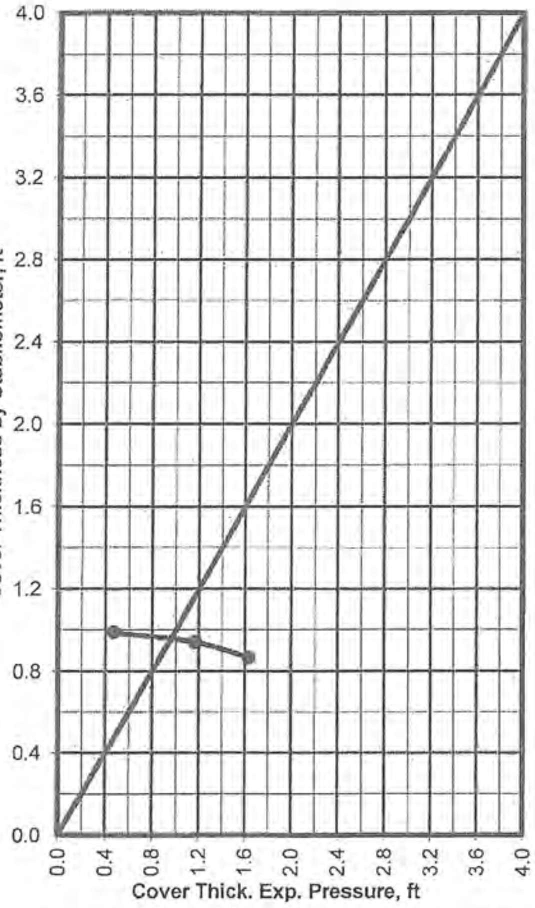
Krazan Testing Laboratory

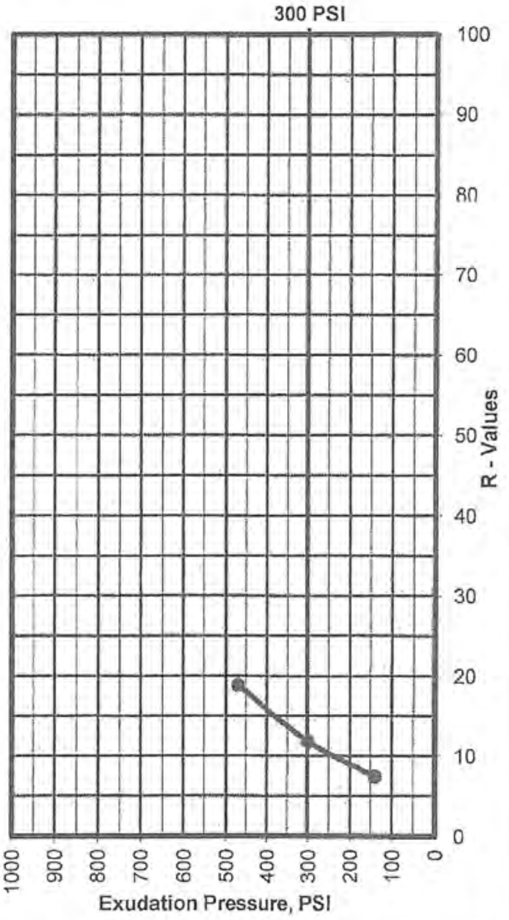
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	012-18019
Project Name	:	Tract 848
Date	:	2/23/2018
Sample Location/Curve Number	:	RV#5
Soil Classification	:	SC/CL

TEST	A	B	C
Percent Moisture @ Compaction, %	19.9	20.7	19.1
Dry Density, lbm/cu.ft.	105.6	104.7	107.3
Exudation Pressure, psi	300	140	470
Expansion Pressure, (Dial Reading)	35	14	49
Expansion Pressure, psf	152	61	212
Resistance Value R	12	7	19

R Value by Expansion Pressure (TI =): 5	11
R Value at 300 PSI Exudation Pressure	12





APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including but not limited to the furnishing of all labor, tools, and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans, and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Inc., hereinafter known as the Soils Engineer and/or Testing Agency. Attainment of design grades when achieved shall be certified to by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer or project Architect.

No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the soil negligence of the Owner or the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to a density not less that 90 percent relative compaction based on ASTM Test Method D1557, UBC or CAL-216, as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be as determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the soil report.

The Contractor shall make his own interpretation of the data contained in said report, and the Contractor shall not be relieved of liability under the Contractor for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing and the preparations of foundation materials for receiving fill.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project, earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter, and all other matter determined by the Soils Engineer to be deleterious. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such a extent which would permit removal of all roots larger than 1 inch. Tree root removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill or tree root excavation should not be permitted until all exposed surfaces have been inspected and the Soils Engineer is present for the proper control of backfill placement and compaction. Burning in areas, which are to receive fill materials, shall not be permitted.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill, building or slab loads shall be prepared as outlined above, excavated/scarified to a depth of 12 inches, moisture-conditioned as necessary, and compacted to 90 percent relative compaction.

Loose soil areas, areas of uncertified fill, and/or areas of disturbed soils shall be moisture-conditioned as necessary and recompacted to 90 percent relative compaction. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas, which are to receive fill materials, shall be approved by the Soils Engineer prior to the placement of any of the fill material.

EXCAVATION: All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. However, compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer.

Both cut and fill shall be surface compacted to the satisfaction of the Soils Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill are as specified.

APPENDIX C

PAVEMENT SPECIFICATIONS

1. DEFINITIONS - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term "Standard Specifications": hereinafter referred to is the 2010 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the applicable tests outlined in the Materials Manual.

2. SCOPE OF WORK - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically notes as "Work Not Included."

3. PREPARATION OF THE SUBGRADE - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 90 percent. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

4. UNTREATED AGGREGATE BASE - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2 material, 1½ inches maximum size. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

5. AGGREGATE SUBBASE - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class 2 material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

6. ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10. The mineral aggregate shall be Type B, ½ inch maximum size, medium grading and shall conform to the requirements set forth in Section 39 of the Standard Specifications. The drying, proportioning and mixing of the materials shall conform to Section 39.

The prime coat, spreading and compacting equipment and spreading and compacting mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50° F. The surfacing shall be rolled with a combination steel wheel and pneumatic rollers, as described in Section 39-6. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

7. FOG SEAL COAT - The fog seal (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of Section 37.

APPENDIX E

TRAFFIC IMPACT STUDY

AUGUST 2019

TRAFFIC IMPACT STUDY

LENNAR LEMOORE

Lemoore, California

Headquarters: 6807 Leameadow Drive • Dallas • Texas 75248 • Phone: (972) 239-8995 • www.ndengpc.com

ND Engineering, PC

TRAFFIC IMPACT STUDY FOR THE LENNAR LEMOORE PROJECT

Lemoore, California

Final: August 2019
Draft: March 2019

Prepared for
Mr. Brandon Broussard, PE
Principal
Yamabe and Horn Engineering, Inc.
2985 N. Burl #101
Fresno, CA 93727

Prepared by
ND Engineering, PC
N. Ruth Davis, PE, PTOE
F-11119
12873 Yancy Lane
Tyler, TX 75707
(972) 239-8995

Naomi Ruth Davis
No. C55461
EXPIRES 12/31/20
CIVIL

N Ruth Davis

This Traffic Impact Study has been prepared under the direction of N. Ruth Davis. N. Ruth Davis attests to the technical information contained therein and has judged the qualifications of recommendations, conclusions, and decisions are based on City of Lemoore and Caltrans guidelines, general engineering standards, and California/Federal laws.

In Association With

Sabine Johnson, Draftsperson/Graphics

Metro Traffic Data, Inc.
310 N. Irwin Street, Ste 20
Hanford, CA 93230

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TRAFFIC IMPACT STUDY
FOR THE
LENNAR LEMOORE PROJECT

EXECUTIVE SUMMARY/INTRODUCTION

This Traffic Impact Study (TIS) was prepared to assess the traffic impacts due to development of approximately 62 acres of vacant land consisting of the following uses:

- 370 single family dwelling units, located on the northeast corner of the new alignment of Semas Avenue and Pederson Street south of the trail and gas pipeline easement. The single family dwelling units will be constructed in three (3) phases. Phase 1 will consist of 155 dwelling units. Phases 1 and 2 will consist of 264 dwelling units. Phases 1, 2, and 3 will consist of 370 dwelling units.
- Mixed use development consisting of 200 multi-family dwelling units and 20,000 square feet (sf) of retail shopping center, located on the southeast corner of College Avenue and Bush Street north of the trail and gas pipeline easement

The Lennar Lemoore Project is located within the Lemoore, California city limits. For purposes of this study, the single family dwelling units are considered the Project and the mixed use component is shown as a proposed project in the Existing Plus Approved/Pending/Proposed and the Existing Plus Approved/Pending/Proposed Plus Project scenarios. As part of this Project, the following roadways will be constructed:

- Semas Drive – new alignment, located to the east of the Project; also known as Semas Avenue
- Pederson Street – located to the south of the Project; also known as Pederson Avenue or Pedersen Avenue or Pedersen Street
- College Avenue – extension from current terminus to Pederson Street; also known as College Drive

Figure 1 shows the Project location and Figure 2 shows the Project site plan.

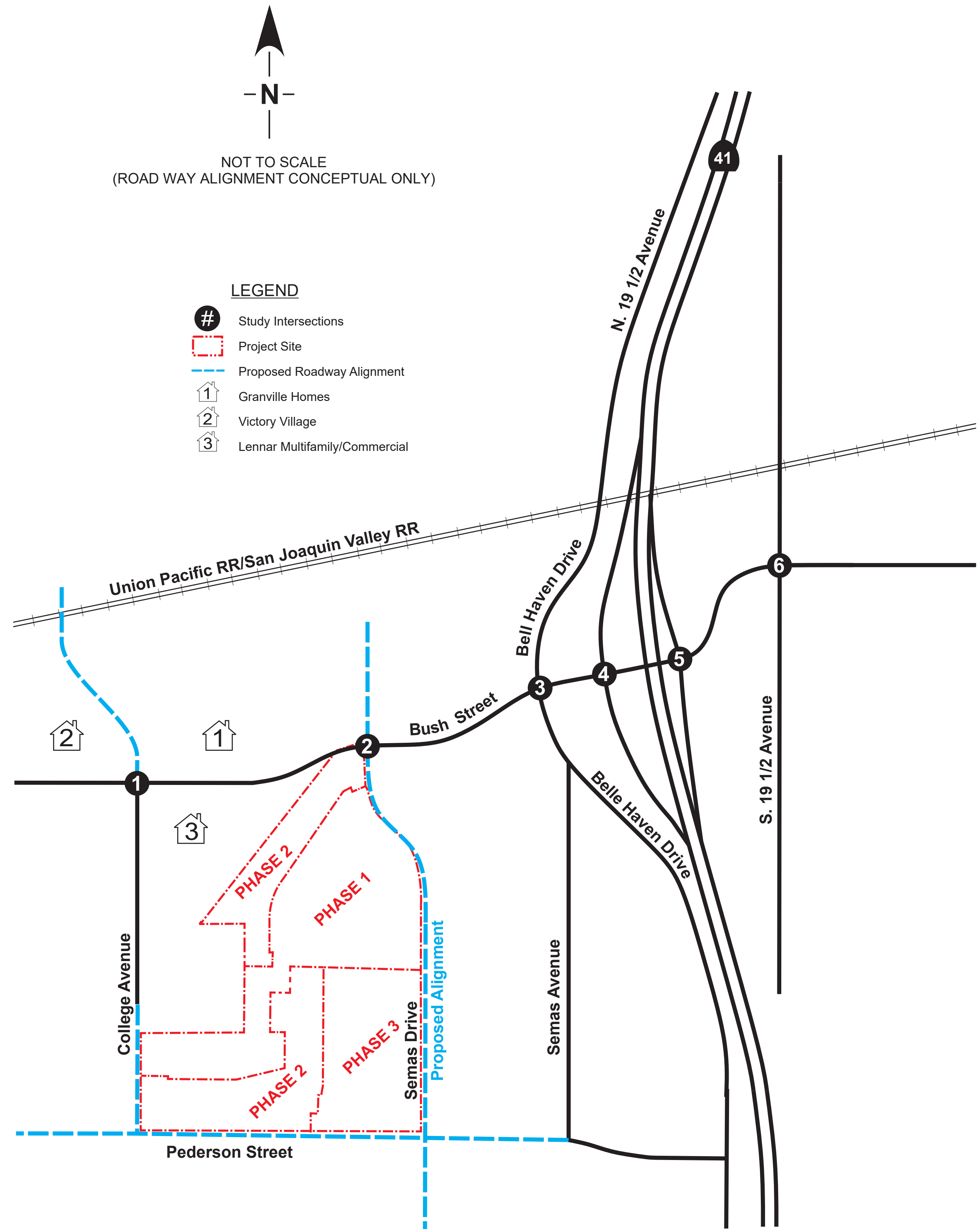
The Project study area for the analysis of traffic impacts extends along Bush Street from College Avenue (west) to 19 1/2 Avenue (east). This report analyzes six (6) intersections for two (2) time periods, weekday AM and PM peak hour of the street. To analyze the traffic impacts resulting from the build out of the Project, 15 scenarios were evaluated. Time frames included in the 15 scenarios are: Existing, Existing Plus Approved/Pending/Proposed Projects (approximately 2022), and 2035. Appendix A contains a description of the Methodology used in this TIS.

Impacts

Based on the information provided in this report, the following locations, by scenario, are projected to operate below the appropriate adopted level of service (LOS) standard:

Existing (2018) (Without the Project)

- Bush Street at State Route (SR) 41 southbound (SB) ramps
    - SB Approach – AM peak hour



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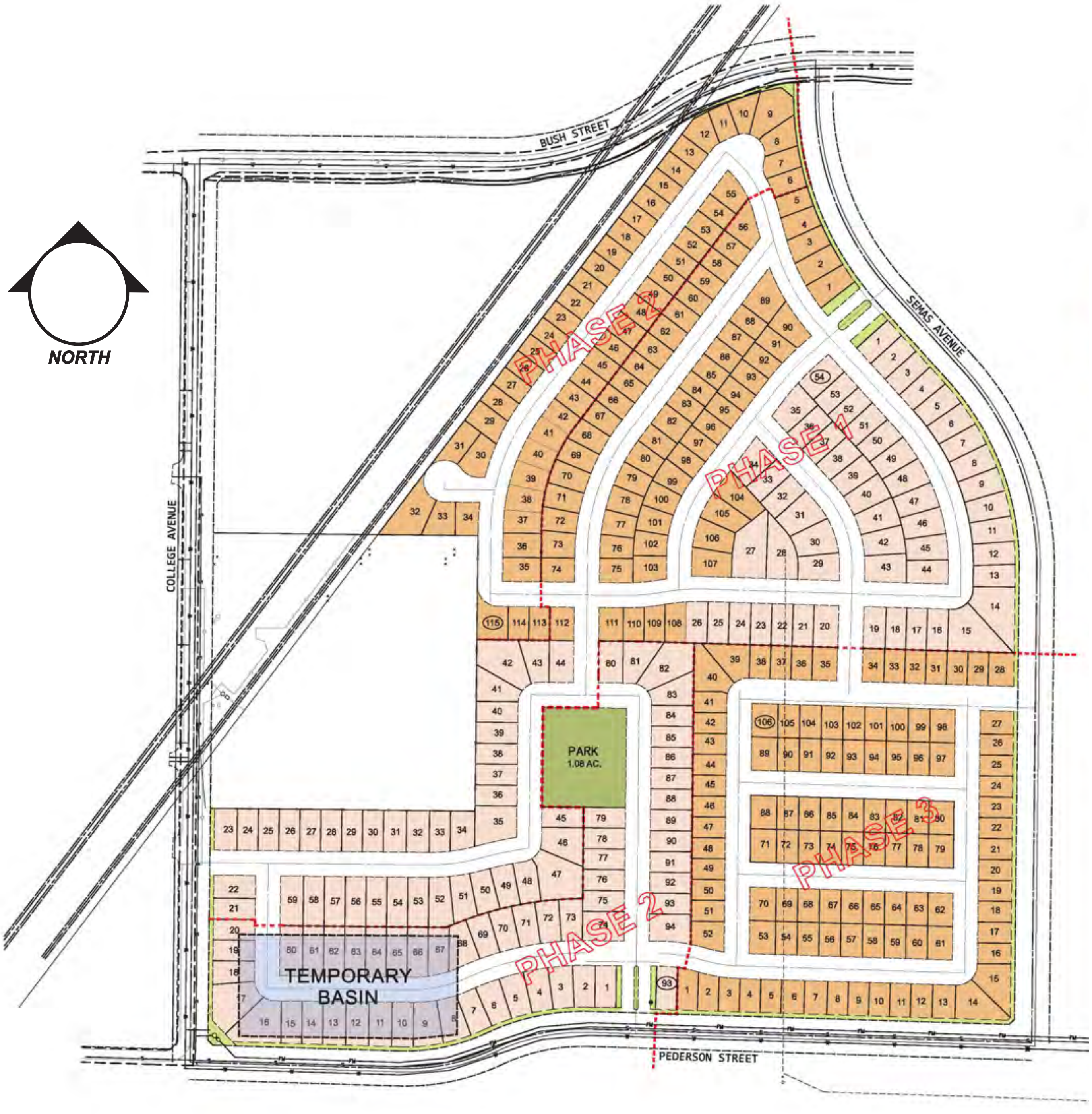
VICINITY MAP

City of Lemoore, California

Figure 1



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SITE PLAN

City of Lemoore, California

Figure 2

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 northbound (NB) Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Project Phase 1 & 2 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Project Phase 1, 2, & 3 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Semas Avenue
    - NB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at College Avenue
    - NB Approach – AM peak hour
    - SB Approach – AM peak hour
- Bush Street at Semas Avenue
    - NB Approach – AM/PM peak hours
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour
- Bush Street at 19 ½ Avenue – AM peak hour

The following locations by scenario are projected to meet the urban peak hour volume signal warrant:

Existing (2018) Plus Project Phase 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps

The following locations by scenario are projected to have movements with queue lengths that exceed or are projected to exceed their available storage lengths:

Existing (2018) (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Project Phases 1 & 2 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps
    - NB Left-Through – AM peak hour
- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps
    - NB Left-Through – AM peak hour
- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Recommendations

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard, or meet the urban peak hour volume signal warrant, or exceed the available storage lengths with the 95th percentile queue lengths the following improvements by scenario are recommended:

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

The majority of the mitigations are the same in all three (3) phases, therefore it is recommended that all mitigations be implemented with completion of Phase 1.

- Bush Street at SR 41 NB Ramps
    - Signalize the intersection

As shown in this document, the urban peak hour volume warrant is not meet at the Bush Street at SR 41 NB Ramps intersection in the Existing (2018) Plus Project Phase 1 scenario. However it should be noted that the Bush Street at SR 41 NB ramp intersection in the Existing (2018) Plus Project Phase 1 scenario, the convergent point where the major street two-directional volume, the minor street highest approach volume, and the number of lanes per approach line is approximately 735 to 736 vehicles per hour major street, and 400 vehicles per hour minor street, which is only six (6) vehicles more than is currently projected for the minor street highest volume in the Existing (2018) Plus Project Phase 1 scenario. These six (6) vehicles would fall within the +/- 10% error range for daily variation in vehicle counts. Therefore, it is recommended that this intersection be signalized in the Existing (2018) Plus Project Phase 1 scenario subject to a complete warrant analysis being prepared at that time.

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive
  - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
  - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
  - Construct an eastbound 75 feet left-turn pocket
  - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
  - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket
- Bush Street at SR 41 SB Ramps
  - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections
- Bush Street at SR 41 NB Ramps
  - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections
- Bush Street at 19 ½ Avenue
  - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1, 2, & 3 (With the Project)

The majority of the mitigations are the same in all three (3) phases, therefore it is recommended that all mitigations be implemented with completion of Phase 1.

Two (2) alternative set of improvements are recommended in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 scenario. The two (2) set of alternatives differ at the Bush Street and College Avenue intersection and the Bush Street at Semas Drive intersection mitigations with the remaining intersection mitigations the same. The two (2) alternatives are referred to as Alternative A and Alternative B and include the following:

- Bush Street at College Avenue (Alternative A)
  - Convert the northbound approach from a shared left-through-right lane to a shared left-through lane and a separate right-turn lane
  - Convert the eastbound approach from a shared left-through and a separate right-turn lane to a shared left-through and a shared through-right lane
  - Convert the westbound approach from a separate left-turn lane and a shared through-right lane to a separate left-turn lane, one (1) through, and a shared through-right lane
- Bush Street at College Avenue (Alternative B)
  - Convert the intersection from a TWSC intersection to a single lane roundabout with shared left-through-right lanes on all approaches
- Bush Street at Semas Drive (Alternative A)
  - Convert the eastbound approach from a shared left-through-right to a separate left-through and a separate through-right lane
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line
- Bush Street at Semas Drive (Alternative B)
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line

- Bush Street at SR 41 NB Ramps (Alternative A or B)
    - Signalize the intersection

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive (Alternative A or B)
    - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
    - Lengthen the southbound left-turn pocket from 75 feet to 100 feet
    - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
    - Construct an eastbound 75 feet left-turn pocket
    - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
    - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket

- Bush Street at SR 41 SB Ramps (Alternative A or B)
    - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections
    - Lengthen the westbound left-turn pocket from 249 feet to 300 feet

- Bush Street at SR 41 NB Ramps (Alternative A or B)
    - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections

- Bush Street at 19 ½ Avenue (Alternative A or B)
    - Convert the westbound separate left-turn, separate through, separate right-turn lane to a separate left-turn, one (1) through, and one through-right-turn lane
    - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

Impact Fees/Proportionate Share Percentages

Assuming the site develops consistent with this TIS, the Project would pay the following Streets and Thoroughfares Impact Fee per phase:

Phase 1
155 DUs X $4,897/DU (fee rate per latest City of Lemoore fee schedule) = $759,035.00

Phase 1 & 2
264 DUs X $4,897/DU (fee rate per latest City of Lemoore fee schedule) = $1,292,808.00

Phase 1, 2, & 3
370 DUs X $4,897/DU (fee rate per latest City of Lemoore fee schedule) = $1,811,890.00

This Streets and Thoroughfares Impact Fee would at a minimum include the following items:

- Bush Street at SR 41 Interchange Redesign/Construction – includes the intersections of Belle Haven Drive, SR 41 SB Ramps, and SR 41 NB Ramps

- Signalization of Bush at College and Bush at 19 ½ Avenue

In addition, the Streets and Thoroughfares Impact Fee may include the following items:

- Widening of Bush Street from Marsh Drive to 19 ½ Avenue
- Construction/Widening of College Avenue from Pederson Street to Bush Street
- Construction of Pederson Street from Marsh Drive to Semas
- Construction of Semas Avenue from Pederson Street to Bush Street

Therefore, any improvements that the Project makes to any of these facilities should be credited towards their impact fees.

City of Lemoore Proportionate Share Percentage for any improvements not included in the impact fees were calculated by taking the Project trips and dividing by the total projected Future year background plus Project volumes for the given study location. The formula used in calculating the City of Lemoore Proportionate Share Percentages is:

Proportionate Share Percentage = Project only trips/(Future year background + Project Volume)

The proportionate share percentages are:

Phase 1

- Bush Street at College Avenue – 4.14%
- Bush Street at Semas Drive – 11.24%
- Bush Street at 19 ½ Avenue – 3.18%

Phase 2

- Bush Street at College Avenue – 6.99%
- Bush Street at Semas Drive – 19.10%
- Bush Street at 19 ½ Avenue – 5.37%

Phase 3

- Bush Street at College Avenue – 9.64%
- Bush Street at Semas Drive – 26.47%
- Bush Street at 19 ½ Avenue – 7.43%

EXISTING (2018) TRAFFIC CONDITIONS

All level of service analyses along Bush Street for intersections west of Belle Haven Drive is dependent on Bush Street operating under normal conditions. Bush Street provides the only access to the Project and land uses west of Belle Haven, including West Hills College, until a secondary access is provided via either an extension of College Avenue north across the Union Pacific railroad tracks to Hanford-Armona Road or a new Marsh Drive at SR 198 interchange. These additional access points are shown as planned improvements needed to accommodate existing and future land use in the City of Lemoore 2030 General Plan but are not specifically discussed in the City of Lemoore Development Impact Fee program.

Transit

The Kings Area Rural Transit (KART) operates two transit routes in the study area. Route 12, KART Transit Center to Skyline and Union, has stops at Bush and Belle Haven and West Hills College (WHC). The route operates Monday through Friday with three (3) AM and two (2) PM stops starting around 8:10 AM and stopping at 5:00 PM. Route 20, KART Transit Center to WHC, likewise has stops at Bush and

Belle Haven and WHC. This route operates Monday through Friday from approximately 6:10 AM to 10:40 AM with 30-minute headways.

Bike

A Class 1 bike path is located along the south side of Bush Street between College Avenue and Belle Haven Drive. Class 1, shared use paths, are non-motorized facilities, paved or unpaved, physically separated from motorized vehicular traffic by an open space or barrier. Additional bike facilities are planned for Bush Street east and west of the current bike path, College Avenue, Semas Avenue (new alignment), Pederson Street, 19 ½ Avenue, the Union Pacific Railroad alignment, and the trail and gas pipeline easement that runs through the Project site.

Roadways

Table 1 describes the Existing (2018) street system in the study area including the street classification, number of lanes, and the posted speed limits.

TABLE 1:
DESCRIPTION OF EXISTING (2018) STREET SYSTEM

Street	Classification	No. of Lanes (2-dir)	Posted Speed Limit (mph)
Bush Street	Arterial	2-3	25-40
College Avenue	Arterial	2	25
Belle Haven Drive	Arterial/Collector	2	40
SR 41	Freeway	4	65
19 ½ Avenue	Collector	2	35

2-dir = two (2) directional *mph = miles per hour* *SR = State Route*

Table 2 lists the study intersections and their associated intersection control.

TABLE 2:
EXISTING (2018) INTERSECTION CONTROL

Intersection	Signalized/Unsignalized	Type
Bush Street at College Avenue	Unsignalized	TWSC
Bush Street at Belle Haven Drive	Unsignalized	AWSC
Bush Street at SR 41 SB Ramps	Unsignalized	TWSC
Bush Street at SR 41 NB Ramps	Unsignalized	TWSC
Bush Street at 19 ½ Avenue	Unsignalized	AWSC

SR = State Route *TWSC = two-way stop-controlled* *AWSC = all-way stop-controlled*
SB = southbound *NB = northbound*

Intersection Level Of Service Analysis

The Existing (2018) intersection lane configurations and intersection controls are shown on Figure 3. The Existing (2018) intersection peak hour traffic volumes are shown on Figure 4. Using the lane configurations shown on Figure 3 and the volumes shown on Figure 4, the intersections were analyzed for Existing (2018) levels of service. Figure 5 and Table 3 show the Existing (2018) levels of service for the study intersections. The two-way stop-controlled (TWSC) levels of service shown on Figure 5 are the levels of service for the worst approach at that intersection. The all-way stop-control (AWSC) levels of service shown in Figure 5 and in Table 3 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 5 and in Table 3. The Existing intersection levels of service calculations are included in Appendix B.

TABLE 3:
EXISTING (2018) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	B	13.9	B	10.5
Bush Street at Belle Haven Drive	C	23.2	B	12.3
Bush Street at SR 41 SB Ramps				
• SB Approach	**F**	**123.6**	C	22.8
Bush Street at SR 41 NB Ramps				
• NB Approach	D	28.7	B	14.3
Bush Street at 19 ½ Avenue	C	23.4	B	12.5

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

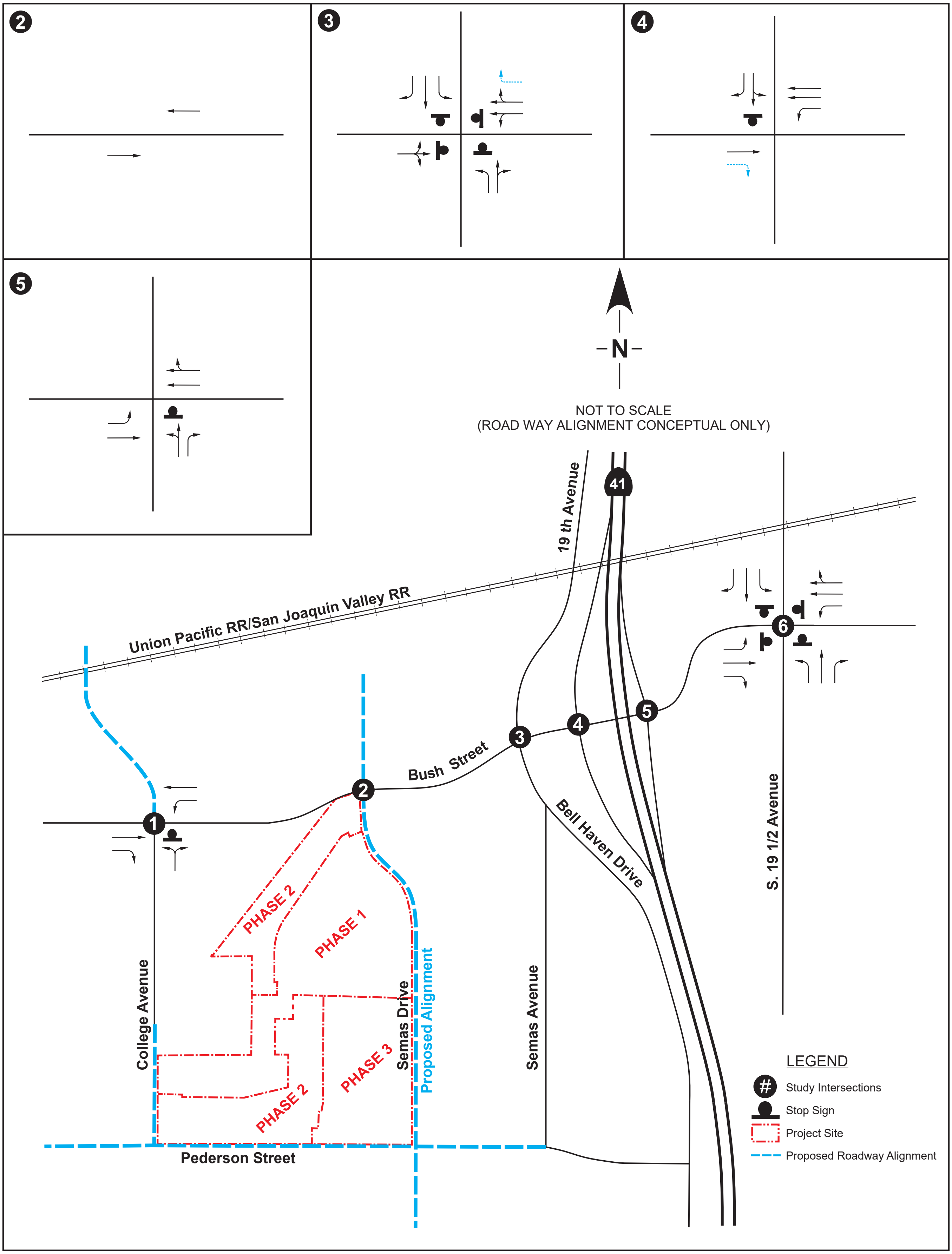
Intersections that are currently operating below the adopted level of service standards are shown bolded in Table 3. As shown in Figure 5 and Table 3, the majority of the study intersections are currently operating at or above the appropriate level of service standard in the Existing (2018) scenario. However, the Bush Street at SR 41 SB ramp intersection southbound approach is operating at a LOS F in the AM peak hour which is below the appropriate adopted level of service standard.

Signal Warrant Analysis

Urban peak hour volume signal warrants were prepared for the following unsignalized intersections:

- Bush Street at College Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB ramps
- Bush Street at SR 41 NB ramps
- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is not met at any of the unsignalized study intersections in the Existing (2018) scenario.



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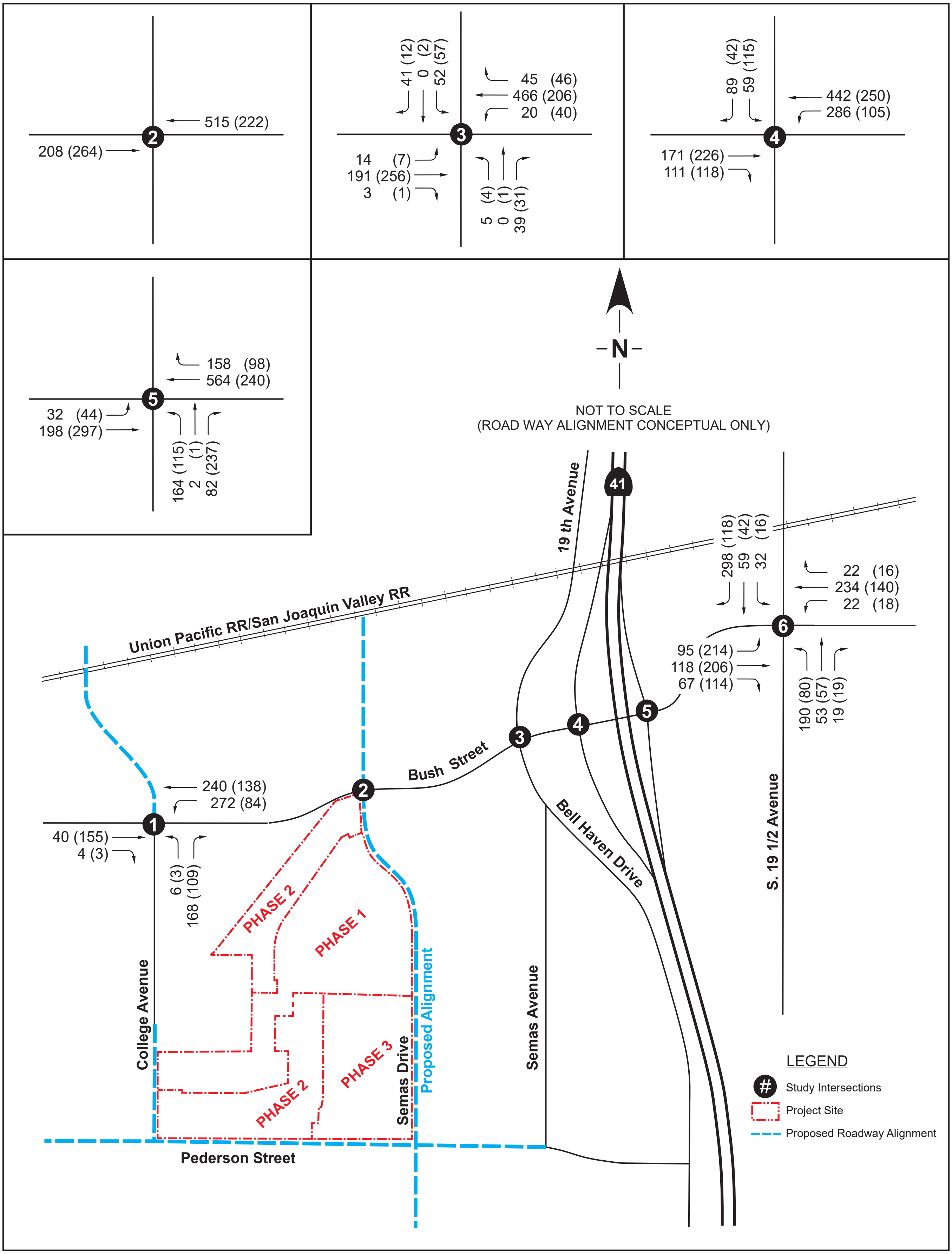
LANE CONFIGURATIONS AND INTERSECTION CONTROL

Existing (2018)

City of Lemoore, California

Figure 3



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INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018)

City of Lemoore, California

Figure 4

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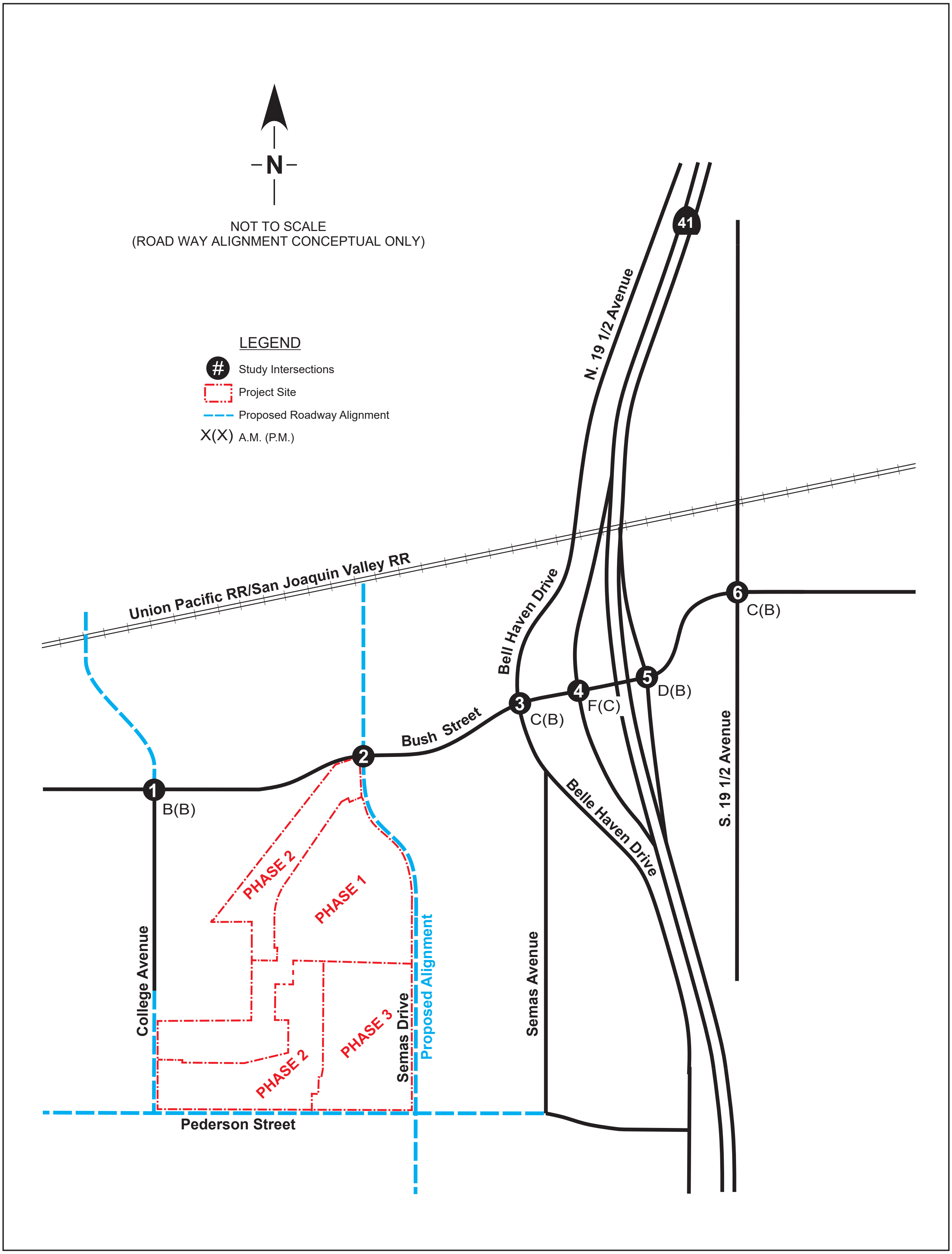

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INTERSECTION LEVEL OF SERVICE

Existing (2018)

City of Lemoore, California

Figure 5

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This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix C.

Queue Lengths

Queuing analyses were performed at all study intersections. Table 4 shows the estimated Existing (2018) 95th percentile queue lengths developed from the level of service analyses.

TABLE 4:
EXISTING (2018) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	33	8
Bush Street at Belle Haven Drive			
• NB Left	50	3	0
• SB Left	75	18	13
• SB Right	75	13	3
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	163	53
• SB Right	466[3]	15	5
• EB Right	75	0	0
• WB Left	249	38	8
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	120	30
• NB Right	300[3]	13	43
• EB Left	114	5	3
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**135**	18
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	168	23
• EB Left	400	58	63
• EB Right	400	28	20
• WB Left	49	5	3
• WB Right	95	30	13

ft = feet *NB = northbound* *SB = southbound* *WB = westbound* *EB = eastbound*
[1] = Total ramp length *[2] = calculated storage distance* *[3] = Distance of ramp striped as 2-lanes (existing)*

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 4. As shown in Table 4, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) scenario:

- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) scenario.

PROJECT

The Lennar Lemoore Project, located in the City of Lemoore, consists of the following uses:

- 370 Single Family Dwelling Units, located on the northeast corner of the new alignment of Semas Avenue and Pederson Street south of the trail and gas pipeline easement. The single family dwelling units will be constructed in three (3) phases. Phase 1 will consist of 155 dwelling units. Phases 1 and 2 will consist of 264 dwelling units. Phases 1, 2, and 3 will consist of 370 dwelling units.
- Mixed use development consisting of 200 multi-family dwelling units and 20,000 square feet of retail shopping center, located on the southeast corner of College Avenue and Bush Street north of the trail and gas pipeline easement

For purposes of this study, the single family dwelling units are considered the Project and the mixed use component is shown as a proposed project in the Existing (2018) Plus Approved/Pending/Proposed scenario. As part of this Project, the following roadways will be constructed:

- Semas Avenue – new alignment, located to the east of the Project
- Pederson Street – located to the south of the Project
- College Avenue – extension from current terminus to Pederson Street

The Project site is currently vacant. Figure 1 shows the Project location and Figure 2 shows the Project site plan.

According to the ITE *Trip Generation* manual[1], the uses analyzed in this report are defined as follows:

- Single Family – "Single-family detached housing includes all single-family detached homes on individual lots."
- Multi-family – "Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors)."
- Shopping Center – "A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. A shopping center also provides on-site parking facilities sufficient to serve its own parking demands."

The trip generation and trip distribution data used in the various Project analyses are described and quantified in the Methodology section in Appendix A.

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[1] *Trip Generation*, 7th edition, Volume 3, ITE, 2003, pages 1,091 and 1,180

EXISTING (2018) PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS

With construction of the entire project, Semas Avenue would be constructed on a new alignment as the eastern boundary, Pederson Street would be constructed as the southern boundary, and College Avenue would be extended south to Pederson Street. Phase 1 construction of these surrounding streets would include the construction of Semas Avenue to the Phase 1 neighborhood entry point, and the extension of College Avenue to the Phase 1 neighborhood entry point. The study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Project and are shown in Figure 6.

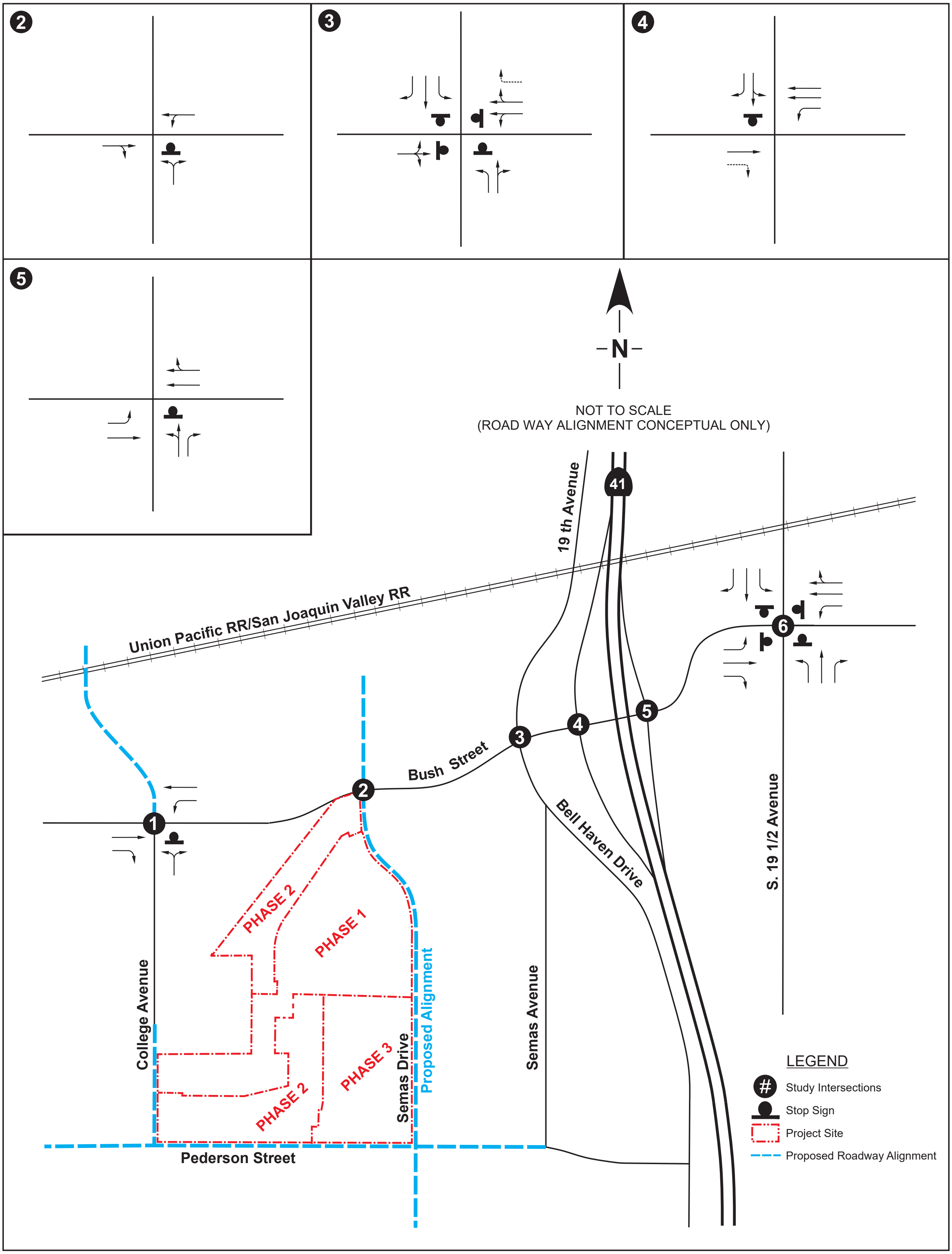
Intersection Level Of Service Analysis

The Existing (2018) Plus Project Phase 1, 2 and 3 intersection lane configurations and intersection controls are shown on Figure 6. The Existing (2018) Plus Project Phase 1 intersection peak hour traffic volumes are shown on Figure 7. Using the lane configurations shown on Figure 6 and the volumes shown on Figure 7, the intersections were analyzed for Existing (2018) Plus Project Phase 1 levels of service. Figure 8 and Table 5 show the Existing (2018) Plus Project Phase 1 levels of service for the study intersections. The TWSC levels of service shown on Figure 8 are the levels of service for the worst approach at that intersection. The AWSC intersection levels of service shown in Figure 8 and in Table 5 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 8 and in Table 5. The Existing (2018) Plus Project Phase 1 intersection levels of service calculations are included in Appendix D.

TABLE 5:
EXISTING (2018) PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	C	15.2	B	10.7
Bush Street at Semas Avenue				
• NB Approach	B	14.2	B	11.7
Bush Street at Belle Haven Drive	**E**	**44.2**	B	14.8
Bush Street at SR 41 SB Ramps				
• **SB Approach**	**F**	**173.4**	D	27.4
Bush Street at SR 41 NB Ramps				
• **NB Approach**	**E**	**46.7**	C	16.4
Bush Street at 19 ½ Avenue	D	26.1	B	12.9

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound



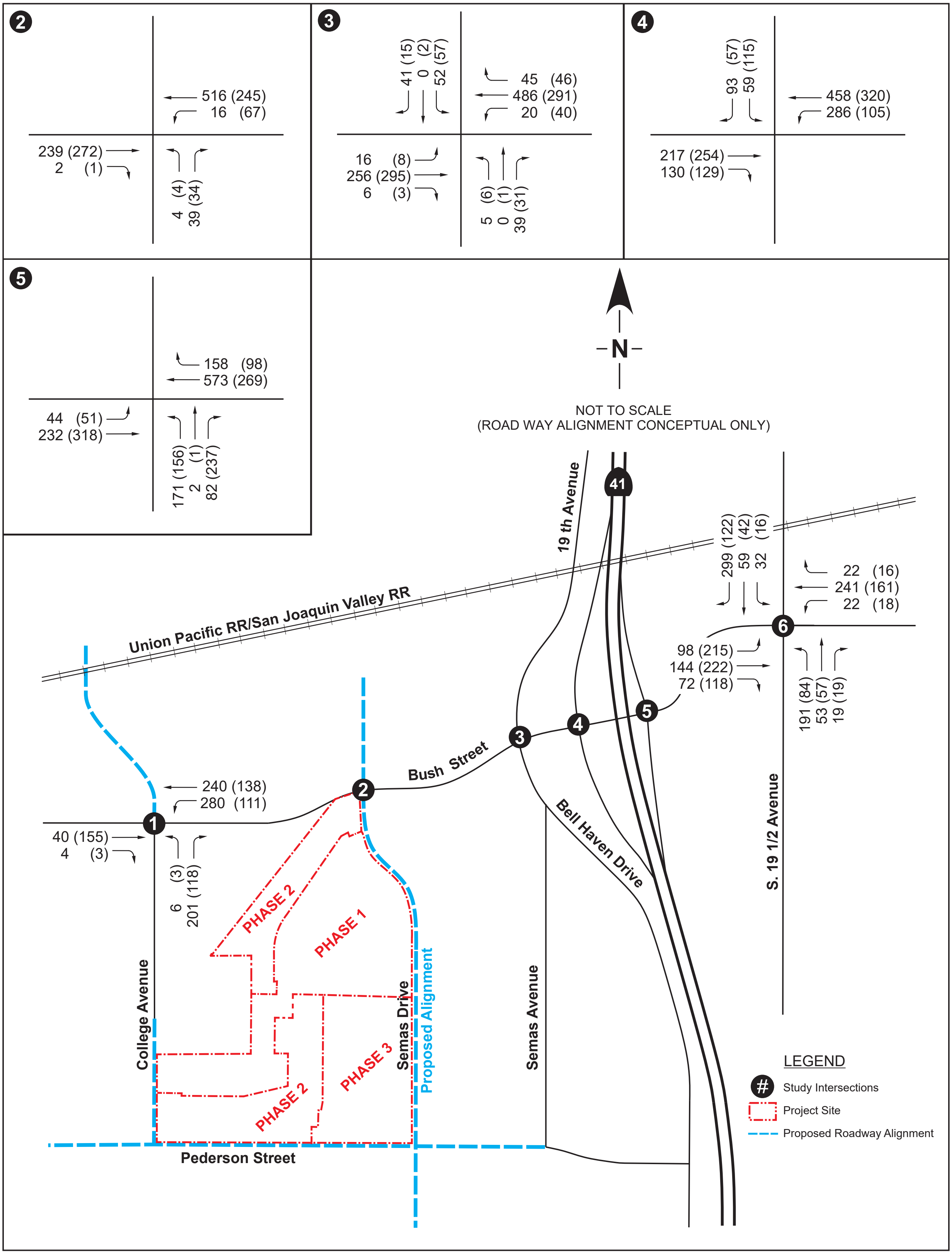
ND Engineering, PC

LANE CONFIGURATIONS AND INTERSECTION CONTROL

Existing (2018) + Project (Phases 1,2, & 3 - 370 DU)

City of Lemoore, California

Figure 6



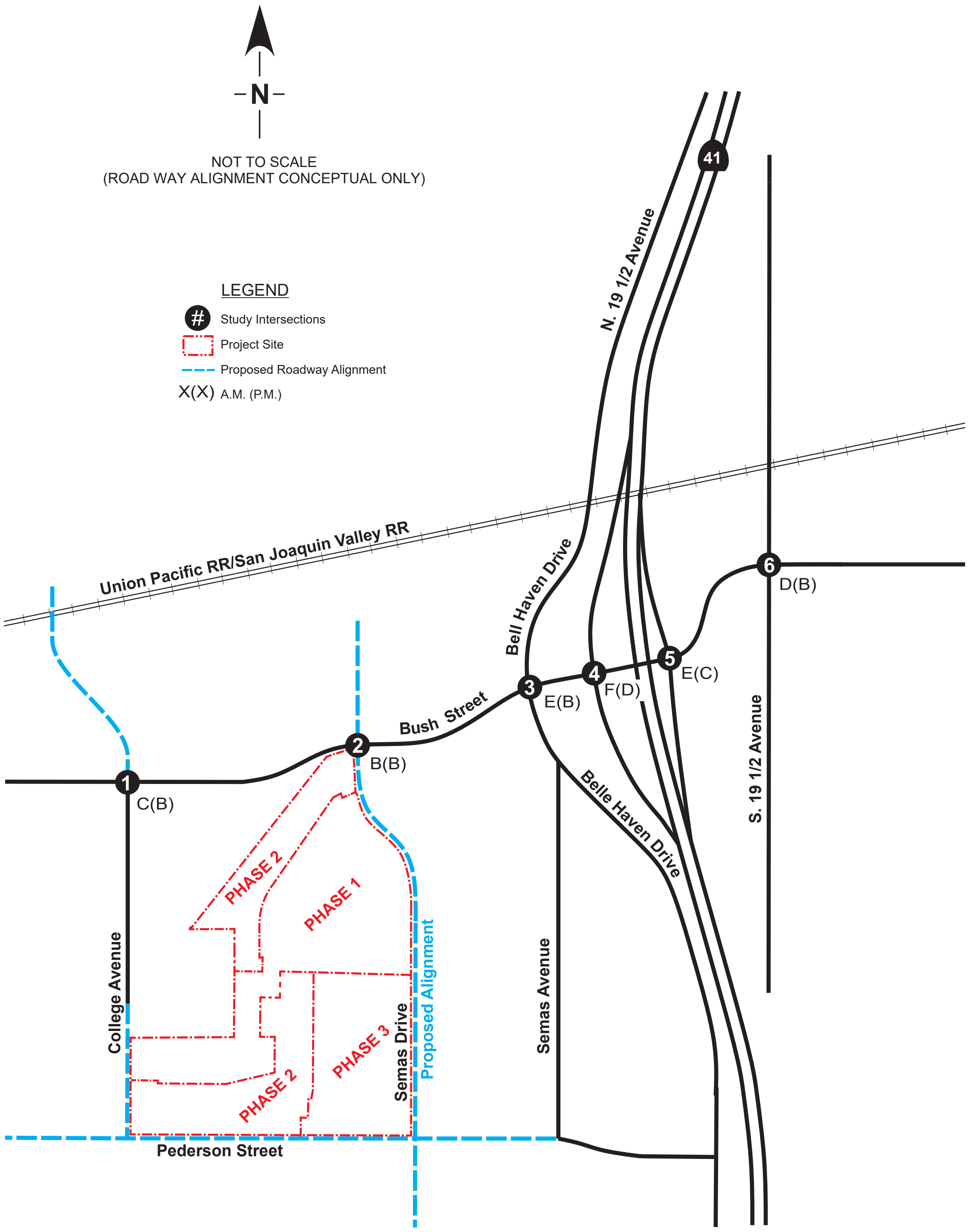
ND Engineering, PC

INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018) + Project (Phase 1 - 155 DU)

City of Lemoore, California

Figure 7



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INTERSECTION LEVEL OF SERVICE

Existing (2018) + Project (Phase 1 - 155 DU)

City of Lemoore, California

Figure 8

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 5. As shown in Figure 8 and Table 5, the following intersections by time period are projected to operate below the adopted level of service in the Existing (2018) Plus Project Phase 1 scenario:

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Existing (2018) Plus Project Phase 1 scenario.

Signal Warrant Analysis

Urban peak hour volume signal warrants were prepared for the following intersections:

- Bush Street at College Avenue
- Bush Street at Semas Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB ramps
- Bush Street at SR 41 NB ramps
- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is not met at any of the unsignalized intersections in the Existing (2018) Plus Project Phase 1 scenario. However it should be noted that at the Bush Street at SR 41 NB ramp intersection in the Existing (2018) Plus Project Phase 1 scenario, the convergent point where the major street two-directional volume, the minor street highest approach volume, and the number of lanes per approach line is approximately 735 to 736 vehicles per hour major street, and 400 vehicles per hour minor street, which is only six (6) vehicles more than is currently projected for the minor street highest volume in the Existing (2018) Plus Project Phase 1 scenario. These six (6) vehicles would fall within the +/- 10% error range for daily variation in vehicle counts.

This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix E.

Queue Lengths

Table 6 shows the estimated Existing (2018) Plus Project Phase 1 95th percentile queue lengths developed from the level of service analyses.

TABLE 6:
EXISTING (2018) PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	33	10
Bush Street at Belle Haven Drive			

TABLE 6:
EXISTING (2018) PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• NB Left	50	3	0
• SB Left	75	18	15
• SB Right	75	13	3
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	185	68
• SB Right	466[3]	15	5
• EB Right	75	0	0
• WB Left	249	43	10
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	180	53
• NB Right	300[3]	15	45
• EB Left	114	8	5
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**145**	18
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	180	23
• EB Left	400	63	65
• EB Right	400	33	20
• WB Left	49	5	3
• WB Right	95	33	13

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 6. As shown in Table 6, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) Plus Project Phase 1 scenario:

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) Plus Project Phase 1 scenario.

MITIGATED EXISTING (2018) PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS

Impacts

Based on the information provided in the previous sections, the following locations, by scenario, are projected to operate below the appropriate adopted level of service standard:

Existing (2018) (Without the Project)

- Bush Street at SR 41 SB ramps
    - SB Approach – AM peak hour

Existing Plus Project Phase 1 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

The following locations by scenario and time period are also projected to have queue storage length exceedances:

Existing (2018) (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard or exceed the available storage lengths in the 95th percentile condition, the following improvements are recommended in the Existing (2018) Plus Project Phase 1 scenario. The mitigated study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Project and are shown in Figure 9.

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at SR 41 NB Ramps
    - Signalize the intersection

The recommendation to signalize this intersection is done so because the forecasted major street and minor street approach volumes are within six (6) vehicles of meeting the urban peak hour volume warrant. These six (6) vehicles would fall within the +/- 10% error range for daily variation in vehicle counts and as such this intersection will likely meet warrants with the build out of Phase 1. Therefore, it is recommended that this intersection be signalized in the Existing (2018) Plus Project Phase 1 scenario subject to a complete warrant analysis being prepared at that time.

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive
    - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection

  - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
  - Construct an eastbound 75 feet left-turn pocket
  - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
  - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket

- Bush Street at SR 41 SB Ramps
  - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections

- Bush Street at SR 41 NB Ramps
  - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections

- Bush Street at 19 ½ Avenue
  - Lengthen the northbound left-turn pocket from 48 feet to 150 feet

Intersection Level Of Service Analysis

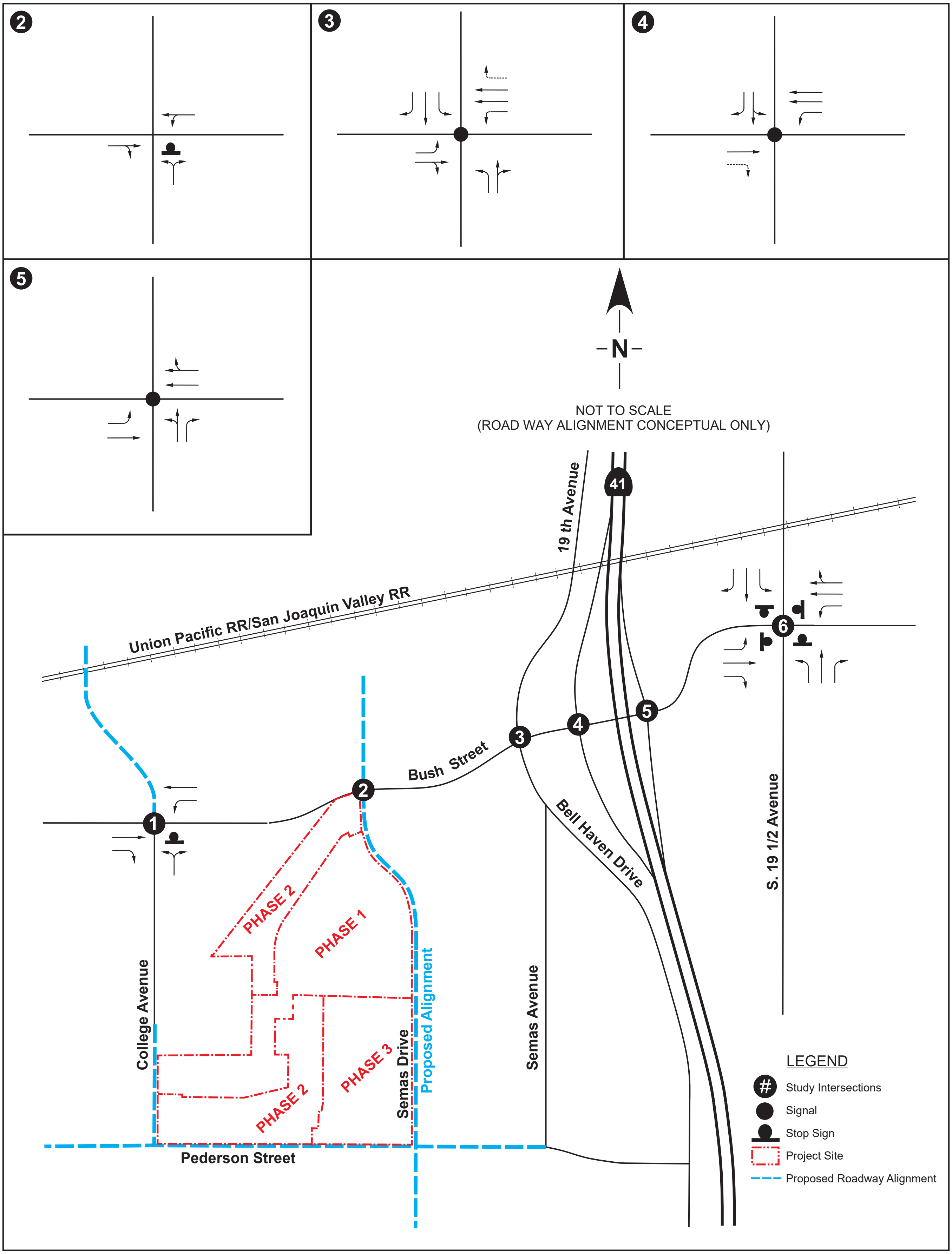
The Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 9. Using the lane configurations shown on Figure 9 and the volumes shown on Figure 7, the intersections were analyzed for Mitigated Existing (2018) Plus Project Phase 1 levels of service. Figure 10 and Table 7 show the Mitigated Existing (2018) Plus Project Phase 1 levels of service for the study intersections. The TWSC levels of service shown on Figure 10 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 10 and in Table 7 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 10 and in Table 7. The Mitigated Existing (2018) Plus Project Phase 1 intersection levels of service calculations are included in Appendix F.

TABLE 7:
MITIGATED EXISTING (2018) PROJECT PHASE 1 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	C	15.2	B	10.7
Bush Street at Semas Avenue				
• NB Approach	B	14.2	B	11.7
Bush Street at Belle Haven Drive	C	28.2	C	26.6
Bush Street at SR 41 SB Ramps	C	24.6	C	24.6
Bush Street at SR 41 NB Ramps	C	21.4	C	20.1
Bush Street at 19 ½ Avenue	D	26.1	B	12.9

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

As shown in Figure 10 and Table 7, with the proposed mitigations all study intersections are projected to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Project Phase 1 scenario.



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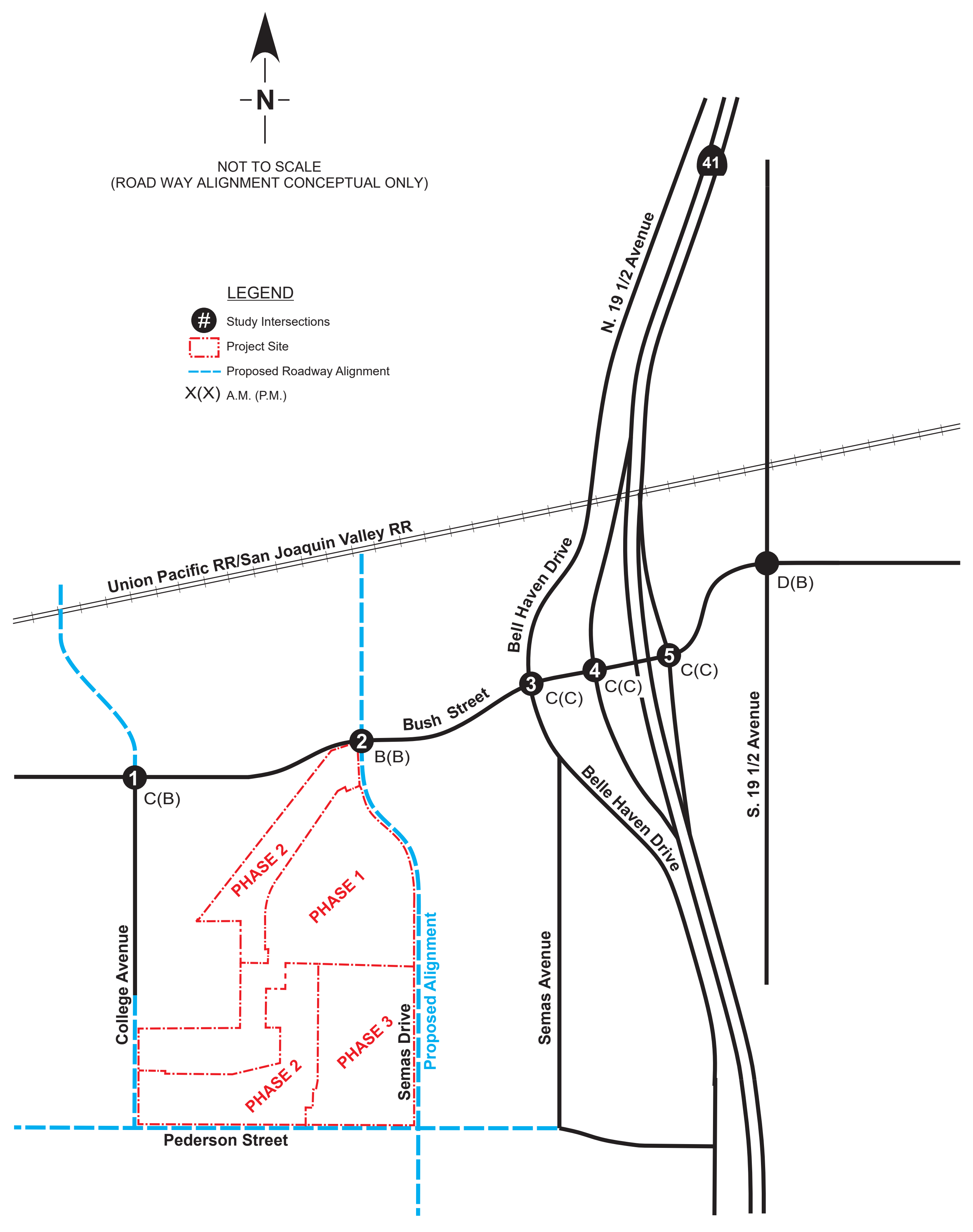
MITIGATED LANE CONFIGURATIONS AND INTERSECTION CONTROL

Existing (2018) + Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 9



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MITIGATED INTERSECTION LEVELS OF SERVICE

Existing (2018) + Project (Phase 1 - 155 DU)

City of Lemoore, California

Figure 10

Queue Lengths

Table 8 shows the estimated Mitigated Existing (2018) Plus Project Phase 1 95th percentile queue lengths developed from the level of service analyses.

TABLE 8:
MITIGATED EXISTING (2018) PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	33	10
Bush Street at Belle Haven Drive			
• NB Left	50	11	15
• SB Left	75	57	63
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	54	85
• SB Right	466[3]	23	17
• EB Right	75	1	m1
• WB Left	249	236	117
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	126	93
• NB Right	300[3]	21	40
• EB Left	114	28	m51
Bush Street at 19 ½ Avenue			
• NB Left	150	145	18
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	180	23
• EB Left	400	63	65
• EB Right	400	33	20
• WB Left	49	5	3
• WB Right	95	33	13

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
m = volume for 95th percentile queue is metered by upstream signal

As shown in Table 8, none of the analyzed intersection queue lengths are projected to exceed the available and recommended mitigated storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Project Phase 1 scenario.

EXISTING (2018) PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS

With construction of the entire project, Semas Avenue would be constructed on a new alignment as the eastern boundary, Pederson Street would be constructed as the southern boundary, and College Avenue would be extended south to Pederson Street. Phase 1 and 2 construction of these surrounding streets would include the construction of Semas Avenue to the Phase 1 neighborhood entry point, the extension of College Avenue to the Pederson Street alignment, and the construction of Pederson Street to the Phase 2 neighborhood entry point. The study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Project and are shown in Figure 6.

Intersection Level Of Service Analysis

The Existing (2018) Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 6. The Existing (2018) Plus Project Phases 1 and 2 intersection peak hour traffic volumes are shown on Figure 11. Using the lane configurations shown on Figure 6 and the volumes shown on Figure 11, the intersections were analyzed for Existing (2018) Plus Project Phases 1 and 2 levels of service. Figure 12 and Table 9 show the Existing (2018) Plus Project Phases 1 and 2 levels of service for the study intersections. The TWSC levels of service shown on Figure 12 are the levels of service for the worst approach at that intersection. The AWSC intersection levels of service shown in Figure 12 and in Table 9 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 12 and in Table 9. The Existing (2018) Plus Project Phases 1 and 2 intersection levels of service calculations are included in Appendix G.

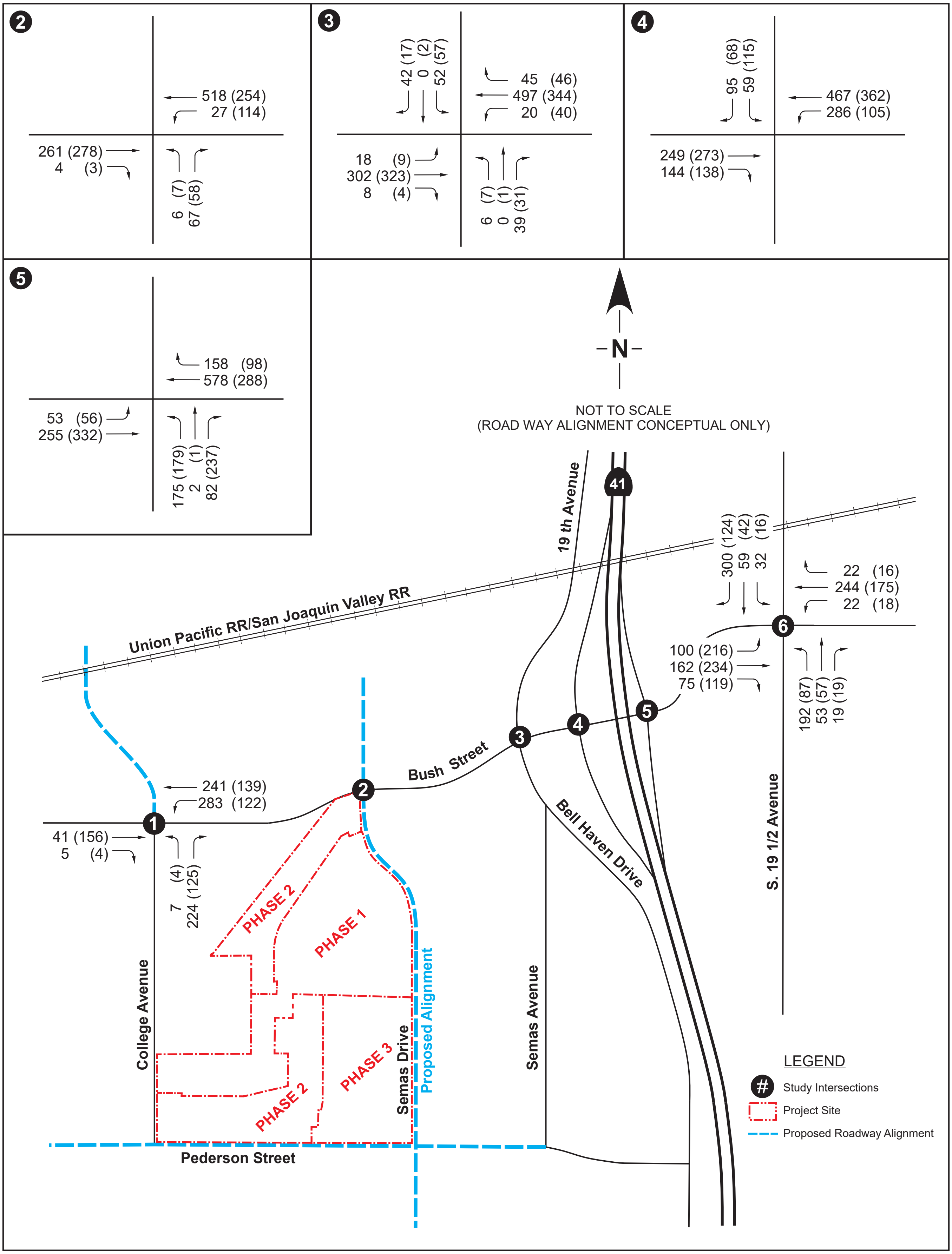
TABLE 9:
EXISTING (2018) PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay^1 (secs)**	**LOS**	**Delay^1 (secs)**
Bush Street at College Drive				
• NB Approach	C	17.5	B	10.9
Bush Street at Semas Avenue				
• NB Approach	C	16.5	B	13.2
Bush Street at Belle Haven Drive	**F**	**74.5**	C	17.5
Bush Street at SR 41 SB Ramps				
• SB Approach	**F**	**231.4**	D	31.3
Bush Street at SR 41 NB Ramps				
• NB Approach	**F**	**72**	C	18.4
Bush Street at 19 ½ Avenue	D	28.5	B	13.4

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 9. As shown in Figure 12 and Table 9, the following intersections by time period are projected to operate below the adopted level of service in the Existing (2018) Plus Project Phases 1 and 2 scenario:

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour



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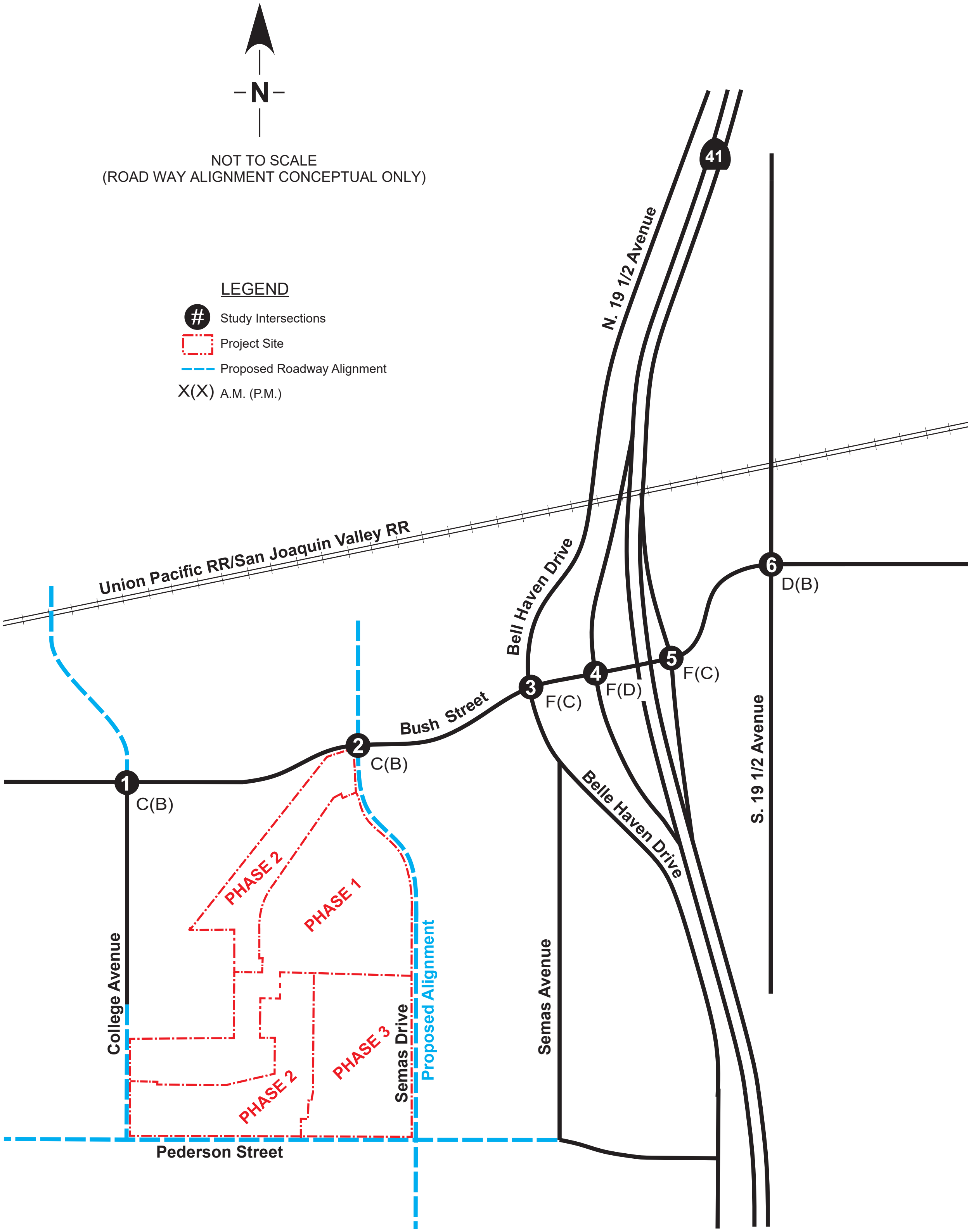
INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018) + Project (Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure 11



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INTERSECTION LEVEL OF SERVICE

Existing (2018) + Project (Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure 12

- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Existing (2018) Plus Project Phases 1 and 2 scenario.

Signal Warrant Analysis

Urban peak hour volume signal warrants were prepared for the following intersections:

- Bush Street at College Avenue
- Bush Street at Semas Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB ramps
- Bush Street at SR 41 NB ramps
- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is met at the Bush Street at SR 41 NB ramp intersection in the Existing (2018) Plus Project Phases 1 and 2 scenario. The urban peak hour volume warrant is not met at any of the remaining unsignalized intersections in the Existing (2018) Plus Project Phases 1 and 2 scenario.

This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix H.

Queue Lengths

Table 10 shows the estimated Existing (2018) Plus Project Phases 1 and 2 95th percentile queue lengths developed from the level of service analyses.

TABLE 10:
EXISTING (2018) PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	35	13
Bush Street at Belle Haven Drive			
• NB Left	50	3	3
• SB Left	75	18	15
• SB Right	75	13	3
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	203	80
• SB Right	466[3]	18	8
• EB Right	75	0	0
• WB Left	249	48	10
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		

TABLE 10:
EXISTING (2018) PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• NB Left-Through	300³	235	73
• NB Right	300³	15	48
• EB Left	114	10	5
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**153**	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	193	25
• EB Left	400	65	68
• EB Right	400	35	20
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 10. As shown in Table 10, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) Plus Project Phases 1 and 2 scenario:

- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) Plus Project Phases 1 and 2 scenario.

MITIGATED EXISTING (2018) PLUS PROJECT PHASES 1 AND 2 TRAFFIC CONDITIONS

Impacts

Based on the information provided in the previous sections, the following locations, by scenario, are projected to operate below the appropriate adopted level of service standard:

Existing (2018) (Without the Project)

- Bush Street at SR 41 SB ramps
  - SB Approach – AM peak hour

Existing Plus Project Phase 1 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
  - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour

Existing Plus Project Phases 1 & 2 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

The following locations by scenario are projected to meet the urban peak hour volume signal warrant:

Existing (2018) Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

The following locations by scenario and time period are also projected to have queue storage length exceedances:

Existing (2018) (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Project Phases 1 &2 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard, meet the urban peak hour signal warrant, or exceed the available storage lengths in the 95th percentile condition, the following improvements are recommended in the Existing (2018) Plus Project Phases 1 and 2 scenario. The mitigated study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Project and are shown in Figure 9.

Existing (2018) Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps
    - Signalize the intersection

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive
    - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
    - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
    - Construct an eastbound 75 feet left-turn pocket

  - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
  - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket
- Bush Street at SR 41 SB Ramps
  - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections
- Bush Street at 19 ½ Avenue
  - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

Intersection Level Of Service Analysis

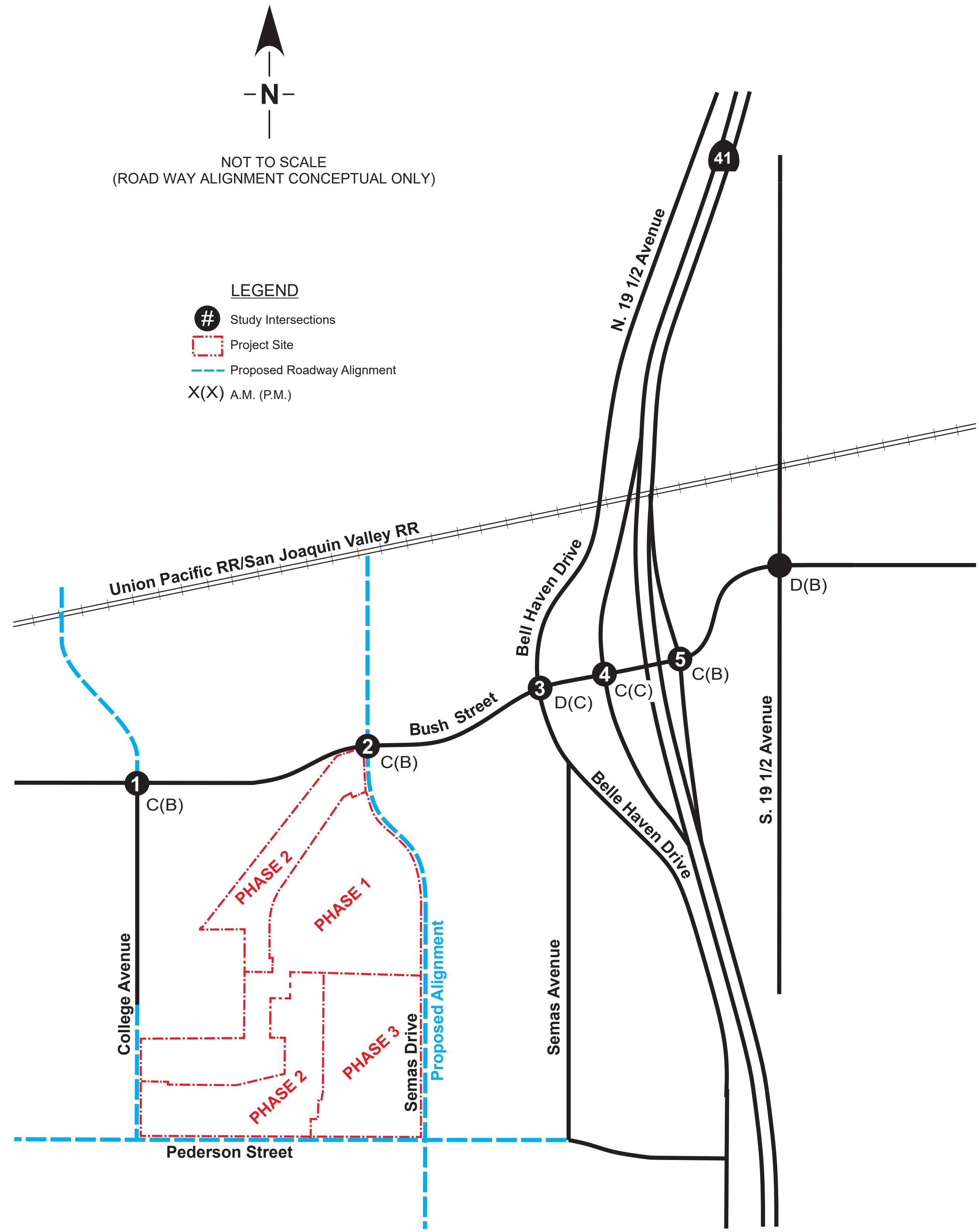
The Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 9. Using the lane configurations shown on Figure 9 and the volumes shown on Figure 11, the intersections were analyzed for Mitigated Existing (2018) Plus Project Phases 1 and 2 levels of service. Figure 13 and Table 11 show the Mitigated Existing (2018) Plus Project Phases 1 and 2 levels of service for the study intersections. The TWSC levels of service shown on Figure 13 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 13 and in Table 11 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 13 and in Table 11. The Mitigated Existing (2018) Plus Project Phases 1 and 2 intersection levels of service calculations are included in Appendix I.

TABLE 11:
MITIGATED EXISTING (2018) PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	C	17.5	B	10.9
Bush Street at Semas Avenue				
• NB Approach	C	16.5	B	13.2
Bush Street at Belle Haven Drive	D	38.1	C	26.9
Bush Street at SR 41 SB Ramps	C	24.7	C	24.0
Bush Street at SR 41 NB Ramps	C	21.6	B	19.9
Bush Street at 19 ½ Avenue	D	28.5	B	13.4

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

As shown in Figure 13 and Table 11, with the proposed mitigations all study intersections are projected to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Project Phases 1 and 2 scenario.



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MITIGATED INTERSECTION LEVELS OF SERVICE

Existing (2018) + Project (Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure 13

Queue Lengths

Table 12 shows the estimated Mitigated Existing (2018) Plus Project Phases 1 and 2 95th percentile queue lengths developed from the level of service analyses.

TABLE 12:
MITIGATED EXISTING (2018) PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	35	13
Bush Street at Belle Haven Drive			
• NB Left	50	13	16
• SB Left	75	57	63
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	55	87
• SB Right	466[3]	24	24
• EB Right	75	1	m1
• WB Left	249	232	117
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	126	107
• NB Right	300[3]	20	41
• EB Left	114	36	m53
Bush Street at 19 ½ Avenue			
• NB Left	175	153	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	193	25
• EB Left	400	65	68
• 68	400	35	20
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
m = volume for 95th percentile queue is metered by upstream signal

As shown in Table 12, none of the analyzed intersection queue lengths are projected to exceed the available and recommended mitigated storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Project Phases 1 and 2 scenario.

EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS

With construction of the project, Semas Avenue would be constructed on a new alignment as the eastern boundary, Pederson Street would be constructed as the southern boundary, and College Avenue would be extended south to Pederson Street. Phase 1, 2, and 3 construction would complete construction of all three (3) boundary streets. The study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Project and are shown in Figure 6.

Intersection Level Of Service Analysis

The Existing (2018) Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 6. The Existing (2018) Plus Project Phases 1, 2, and 3 intersection peak hour traffic volumes are shown on Figure 14. Using the lane configurations shown on Figure 6 and the volumes shown on Figure 14, the intersections were analyzed for Existing (2018) Plus Project Phases 1, 2, and 3 levels of service. Figure 15 and Table 13 show the Existing (2018) Plus Project Phases 1, 2, and 3 levels of service for the study intersections. The TWSC levels of service shown on Figure 15 are the levels of service for the worst approach at that intersection. The AWSC intersection levels of service shown in Figure 15 and in Table 13 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 15 and in Table 13. The Existing (2018) Plus Project Phases 1, 2, and 3 intersection levels of service calculations are included in Appendix J.

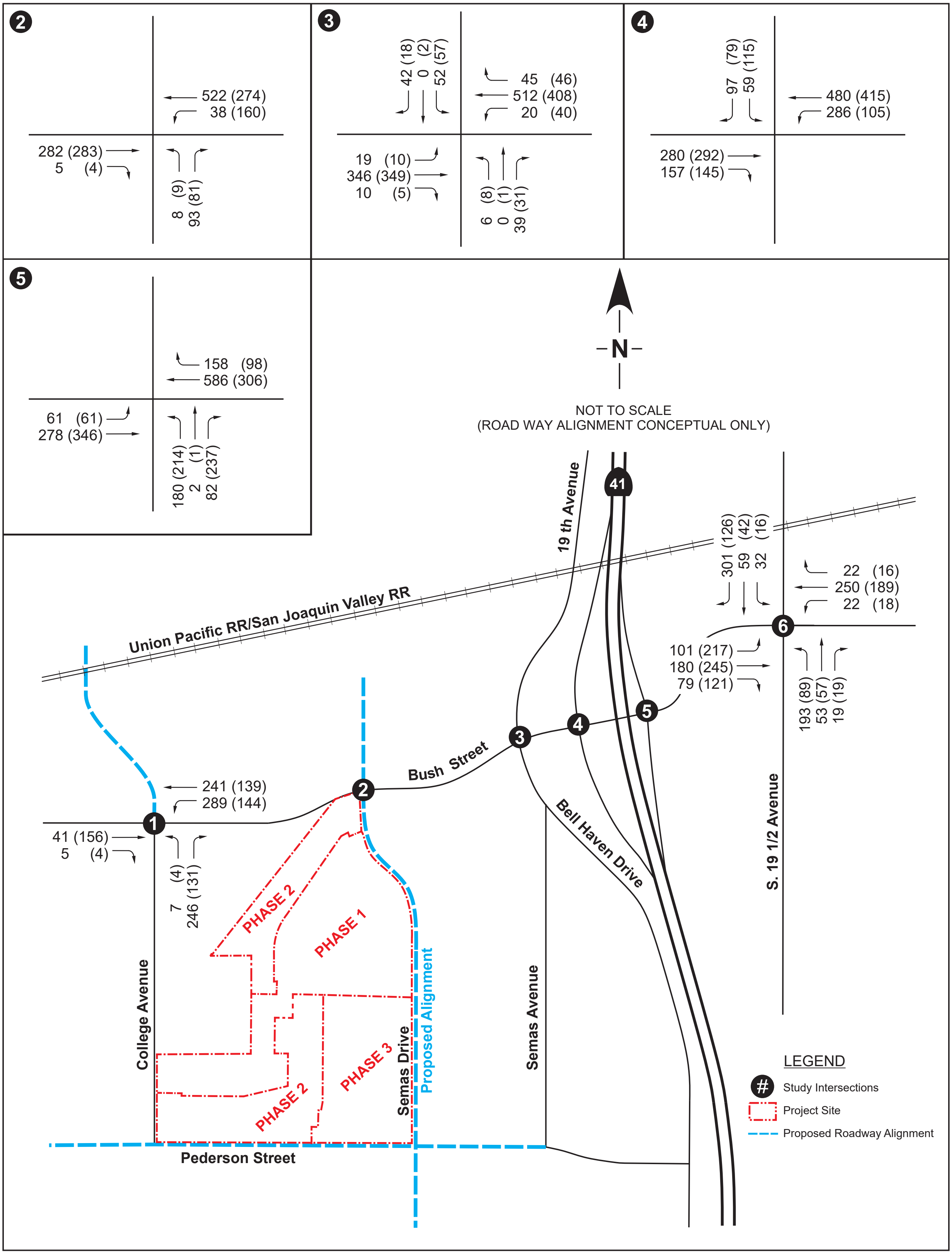
TABLE 13:
EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		PM Peak Hour	
Intersection	**LOS**	**Delay^1 (secs)**	**LOS**	**Delay^1 (secs)**
Bush Street at College Drive				
• NB Approach	C	19.2	B	11.1
Bush Street at Semas Avenue				
• NB Approach	C	20.7	C	15.2
Bush Street at Belle Haven Drive	**F**	**110.0**	C	21.8
Bush Street at SR 41 SB Ramps				
• **SB Approach**	**F**	**285.0**	**E**	**37.6**
Bush Street at SR 41 NB Ramps				
• **NB Approach**	**F**	**109.0**	C	23.0
Bush Street at 19 ½ Avenue	D	32.1	B	13.8

^{1} Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 13. As shown in Figure 15 and Table 13, the following intersections by time period are projected to operate below the adopted level of service in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario:

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
  - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour



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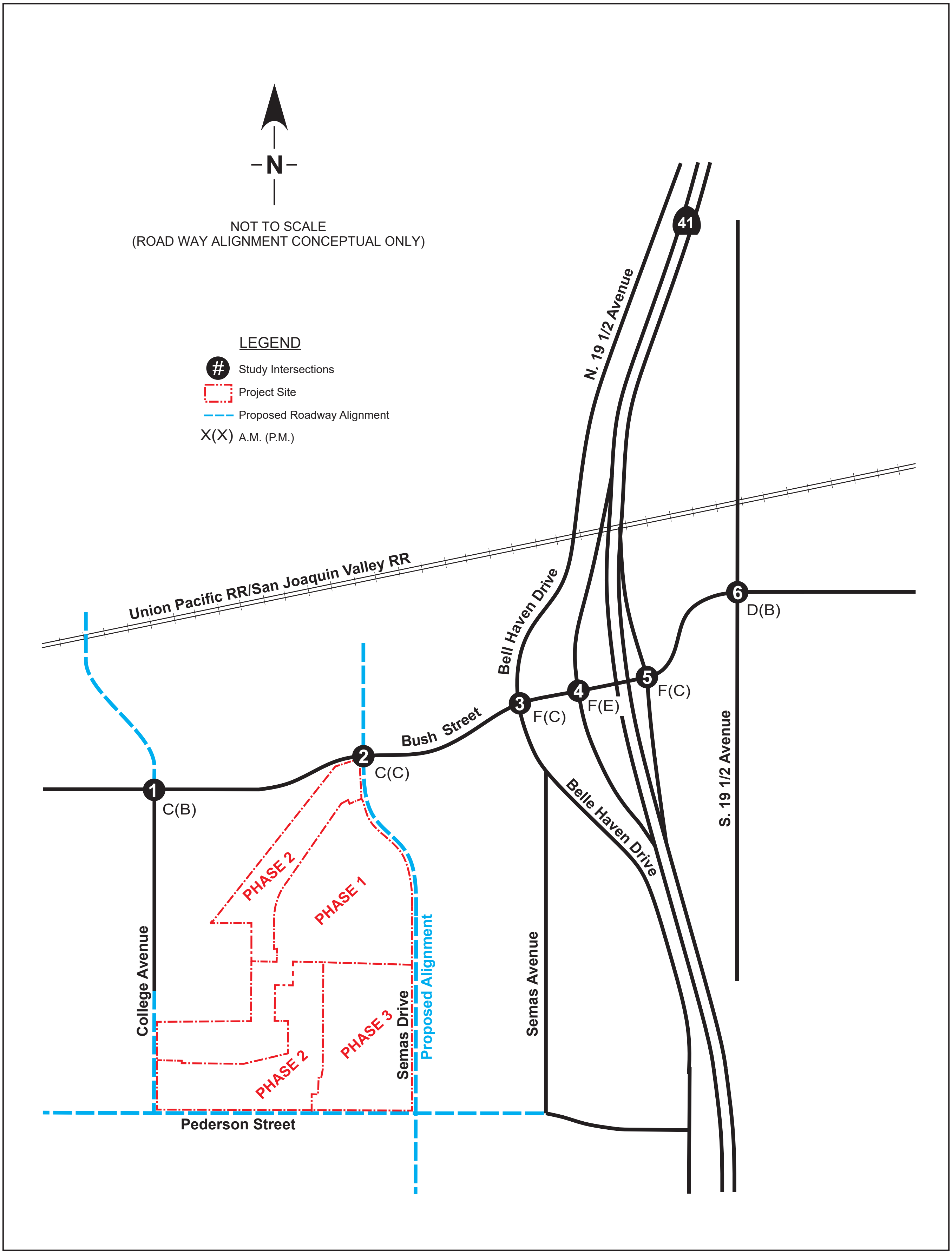
INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018) + Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 14



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INTERSECTION LEVEL OF SERVICE

Existing (2018) + Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 15

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario.

Signal Warrant Analysis

Urban peak hour volume signal warrants were prepared for the following intersections:

- Bush Street at College Avenue
- Bush Street at Semas Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB ramps
- Bush Street at SR 41 NB ramps
- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is met at the Bush Street at SR 41 NB ramp intersection in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario. The urban peak hour volume warrant is not met at any of the remaining unsignalized intersections in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario.

This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix K.

Queue Lengths

Table 14 shows the estimated Existing (2018) Plus Project Phases 1, 2, and 3 95th percentile queue lengths developed from the level of service analyses.

TABLE 14:
EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	35	15
Bush Street at Belle Haven Drive			
• NB Left	50	3	3
• SB Left	75	18	15
• SB Right	75	13	3
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	218	98
• SB Right	466[3]	18	10
• EB Right	75	0	0
• WB Left	249	53	10
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	293	113
• NB Right	300[3]	18	48

TABLE 14:
EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• EB Left	114	13	5
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**163**	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	203	25
• EB Left	400	68	70
• EB Right	400	38	23
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 14. As shown in Table 14, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario:

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario.

MITIGATED EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS

Impacts

Based on the information provided in the previous sections, the following locations, by scenario, are projected to operate below the appropriate adopted level of service standard:

Existing (2018) (Without the Project)

- Bush Street at SR 41 SB ramps
    - SB Approach – AM peak hour

Existing Plus Project Phase 1 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing Plus Project Phases 1 & 2 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

The following locations by scenario are projected to meet the urban peak hour volume signal warrant:

Existing (2018) Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Project Phase 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps

The following locations by scenario and time period are also projected to have queue storage length exceedances:

Existing (2018) (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Project Phases 1 &2 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard, meet the urban peak hour signal warrant, or exceed the available storage lengths in the 95th percentile condition, the following improvements are recommended in the Existing (2018) Plus Project Phases 1, 2, and 3 scenario. The mitigated study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Project and are shown in Figure 9.

Existing (2018) Plus Project Phases 1, 2 & 3 (With the Project)

- Bush Street at SR 41 NB Ramps
    - Signalize the intersection

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive
    - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
    - Lengthen the southbound left-turn pocket from 75 feet to 100 feet
    - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
    - Construct an eastbound 75 feet left-turn pocket
    - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
    - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket

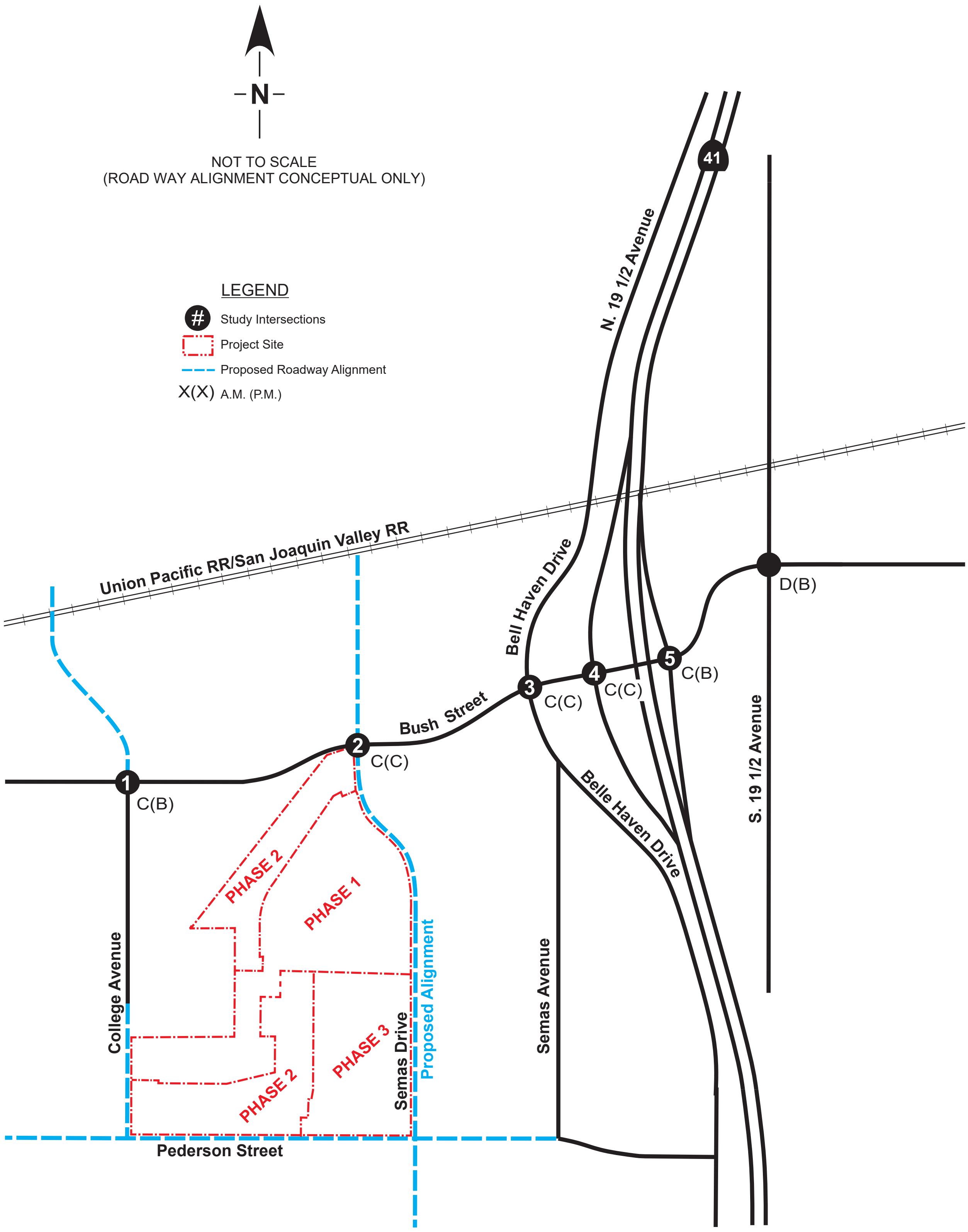
- Bush Street at SR 41 SB Ramps
    - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections
    - Lengthen the westbound left-turn pocket from 249 feet to 350 feet

- Bush Street at SR 41 NB Ramps
    - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections

- Bush Street at 19 ½ Avenue
    - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

Intersection Level Of Service Analysis

The Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 9. Using the lane configurations shown on Figure 9 and the volumes shown on Figure 14, the intersections were analyzed for Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 levels of service. Figure 16 and Table 15 show the Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 levels of service for the study intersections. The TWSC levels of service shown on Figure 16 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 16 and in Table 15 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 16 and in Table 15. The Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 intersection levels of service calculations are included in Appendix L.



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MITIGATED INTERSECTION LEVELS OF SERVICE

Existing (2018) + Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 16

TABLE 15:
MITIGATED EXISTING (2018) PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
- NB Approach	C	19.2	B	11.1
Bush Street at Semas Avenue				
- NB Approach	C	20.7	C	15.2
Bush Street at Belle Haven Drive	C	28.8	C	27.0
Bush Street at SR 41 SB Ramps	C	26.2	C	23.3
Bush Street at SR 41 NB Ramps	C	23.5	B	19.7
Bush Street at 19 ½ Avenue	D	32.1	B	13.8

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

As shown in Figure 16 and Table 15, with the proposed mitigations all study intersections are projected to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 scenario.

Queue Lengths

Table 16 shows the estimated Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 95th percentile queue lengths developed from the level of service analyses.

TABLE 16:
MITIGATED EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

		95th Percentile Queue Length (ft)	
Intersection Approach	Existing (2018) Queue Storage Length (ft)	AM	PM
Bush Street at College Avenue			
- EB Right	80	0	0
- WB Left	394	35	15
Bush Street at Belle Haven Drive			
- NB Left	50	14	17
- SB Left	75	63	63
- SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
- SB Left-Through	466[3]	62	89
- SB Right	466[3]	25	31
- EB Right	75	1	m1
- **WB Left**	**249**	**273**	117
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
- NB Left-Through	300[3]	146	128

TABLE 16:
MITIGATED EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS ANALYSIS 95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• NB Right	300[3]	22	41
• EB Left	114	53	m56
Bush Street at 19 ½ Avenue			
• NB Left	175	163	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	203	25
• EB Left	400	68	70
• EB Right	400	38	23
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
m = volume for 95th percentile queue is metered by upstream signal

Intersection queue lengths projected to exceed the available and recommended mitigated storage lengths are shown bolded in Table 16. As shown in Table 16, the following intersection queue lengths, by time period, are projected to exceed the available and recommended storage lengths in the Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 scenario:

- Bush Street at SR 41 SB ramps
    - WB left – AM peak hour

The Bush Street at SR 41 SB Ramp westbound left-turn will need to be lengthened to 300 feet to avoid the exceedance which will back it up to the SR 41 NB ramps eastbound left-turn pocket. The remaining analyzed intersection queue lengths are not projected to exceed the available and recommended mitigated storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 scenario.

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECT CONDITIONS

In the Existing (2018) Plus Approved/Pending/Proposed Projects, the following Approved/Pending/Proposed Projects are expected to be constructed:

- Granville Homes – 141 multi-family dwelling units located north of Bush Street between College Avenue and Semas Drive – currently vacant
- Victory Village – 51 dwelling units, located north of Bush Street west of College Avenue – currently vacant
- Lennar Mixed Use –200 multi-family dwelling units and 20,000 square feet (sf) of retail shopping center, located on the southeast corner of College Avenue and Bush Street north of the trail and gas pipeline easement – currently vacant

Intersection Level Of Service Analysis

The Existing (2018) Plus Approved/Pending/Proposed Projects intersection lane configurations and intersection controls are shown on Figure 17. The Existing (2018) Plus Approved/Pending/Proposed Projects intersection peak hour traffic volumes are shown on Figure 18. Using the lane configurations shown on Figure 17 and the volumes shown on Figure 18, the intersections were analyzed for Existing (2018) Plus Approved/Pending/Proposed Projects levels of service. Figure 19 and Table 17 show the Existing (2018) Plus Approved/Pending/Proposed Projects levels of service for the study intersections. The TWSC levels of service shown on Figure 19 are the levels of service for the worst approach at that intersection. The AWSC intersection levels of service shown in Figure 19 and in Table 17 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 19 and in Table 17. The Existing (2018) Plus Approved/Pending/Proposed Projects intersection levels of service calculations are included in Appendix M.

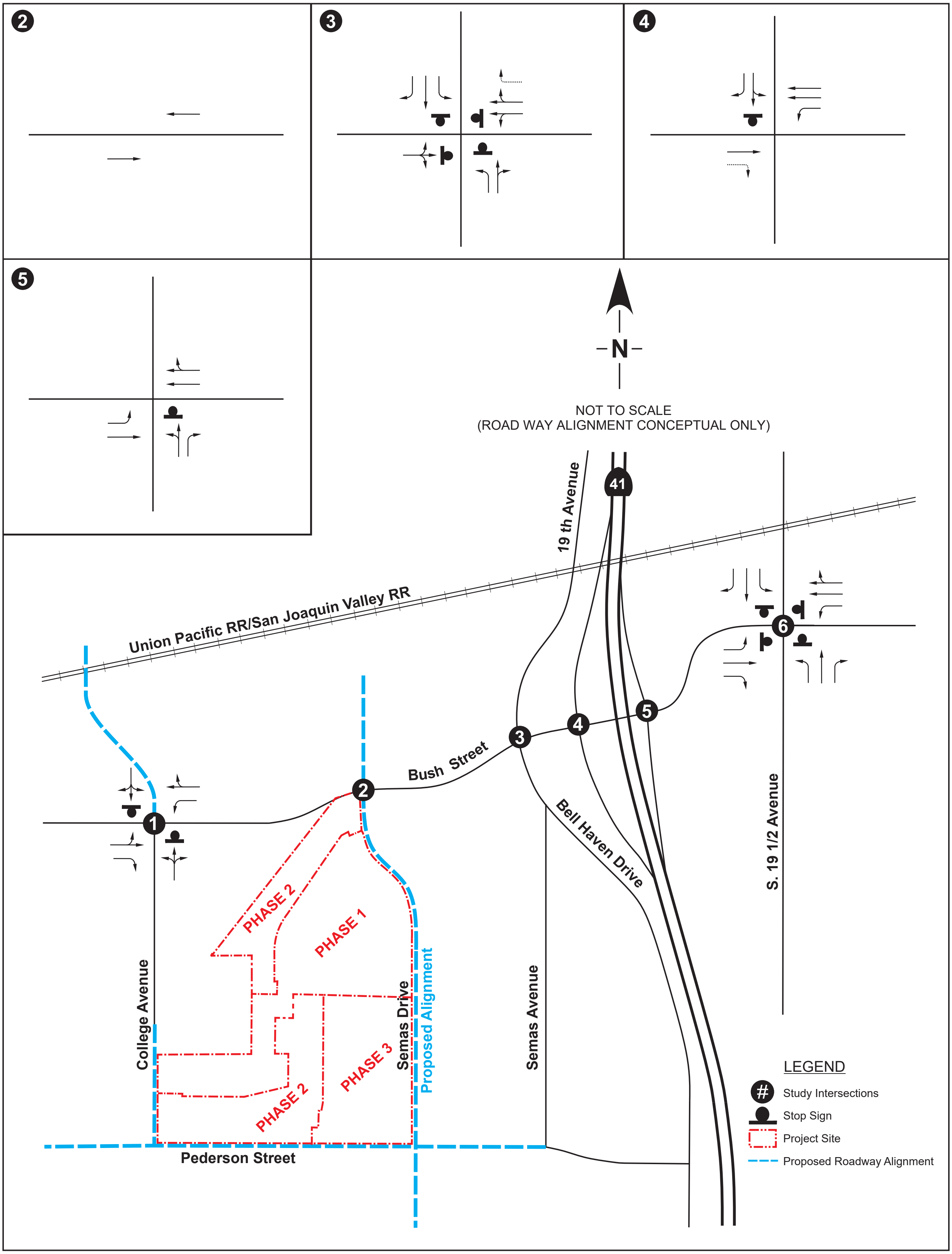
TABLE 17:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay^1 (secs)**	**LOS**	**Delay^1 (secs)**
Bush Street at College Avenue				
• NB Approach	C	21.0	B	11.5
• **SB Approach**	**F**	**184.0**	C	23.2
Bush Street at Belle Haven Avenue	**F**	**53.0**	C	15.7
Bush Street at SR 41 SB Ramps				
• **SB Approach**	**F**	**174.4**	D	26.0
Bush Street at SR 41 NB Ramps				
• **NB Approach**	**E**	**45.1**	C	15.7
Bush Street at 19 ½ Avenue	D	25.5	B	12.8

^{1} Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 17. As shown in Figure 19 and Table 17, the following locations by time period are projected to operate below the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects scenario:

- Bush Street at College Avenue
  - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
  - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour



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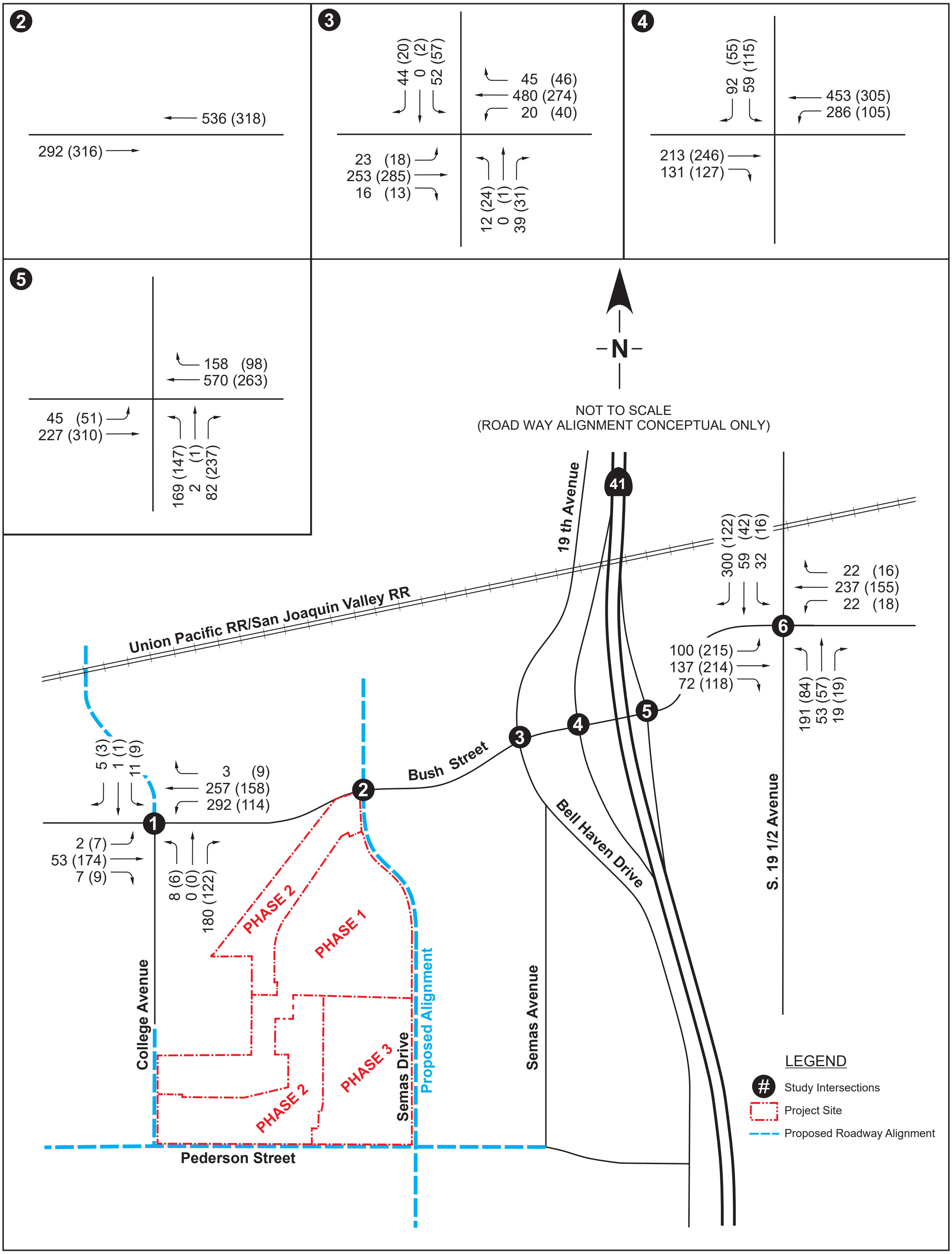
LANE CONFIGURATIONS AND INTERSECTION CONTROL

Existing (2018) + Approved/Pending/Proposed Projects

City of Lemoore, California

Figure 17



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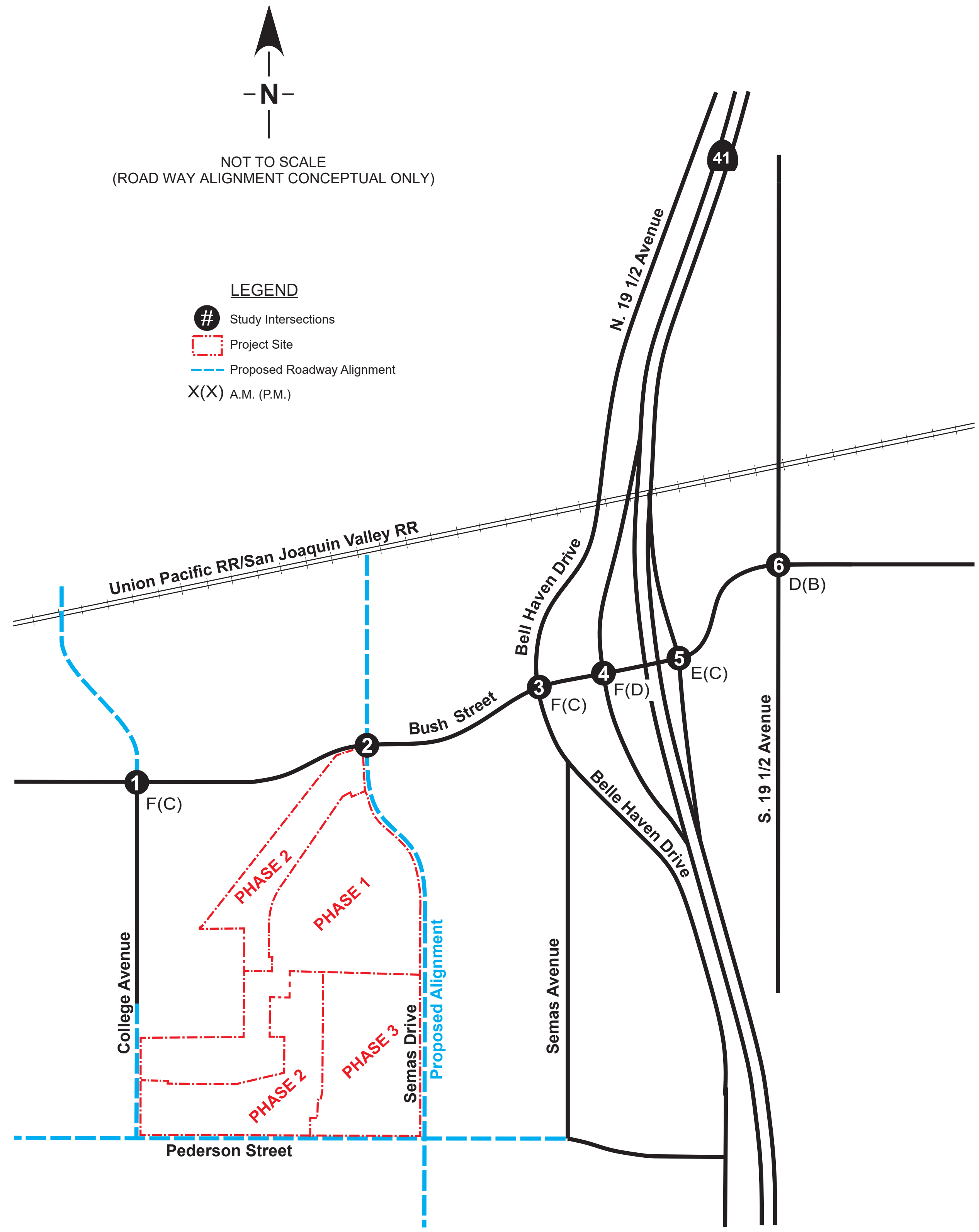
INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018) + Approved/Pending/Proposed Projects

City of Lemoore, California

Figure 18



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INTERSECTION LEVEL OF SERVICE

Existing (2018) + Approved/Pending/Proposed Projects

City of Lemoore, California

Figure 19

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects scenario.

Signal Warrant Analysis

The urban peak hour volume signal warrants were prepared for the following unsignalized intersections:

- Bush Street at College Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB Ramps
- Bush Street at SR 41 NB Ramps
- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is not met at any of the unsignalized study intersections in the Existing (2018) Plus Approved/Pending/Proposed Projects scenario.

This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix N.

Queue Lengths

Queuing analyses were performed at all study intersections. Table 18 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects 95th percentile queue lengths developed from the level of service analyses.

TABLE 18:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	38	10
Bush Street at Belle Haven Drive			
• NB Left	50	5	5
• SB Left	75	18	15
• SB Right	75	13	5
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	185	63
• SB Right	466[3]	15	5
• EB Right	75	0	0
• WB Left	249	43	10
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	175	48
• NB Right	300[3]	15	45

TABLE 18:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• EB Left	114	8	5
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**145**	18
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	180	23
• EB Left	400	63	65
• EB Right	400	33	20
• WB Left	49	5	3
• WB Right	95	30	13

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 18. As shown in Table 18, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) Plus Approved/Pending/Proposed Projects scenario:

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) Plus Approved/Pending/Proposed Projects scenario.

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS

With construction of the entire project, Semas Avenue would be constructed on a new alignment as the eastern boundary, Pederson Street would be constructed as the southern boundary, and College Avenue would be extended south to Pederson Street. Phase 1 construction of these surrounding streets would include the construction of Semas Avenue to the Phase 1 neighborhood entry point, and the extension of College Avenue to the Phase 1 neighborhood entry point. The study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Approved/Pending/Proposed Projects Plus Project and are shown in Figure 20.

Intersection Level Of Service Analysis

The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 20. The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 intersection peak hour traffic volumes are shown on Figure 21. Using the lane configurations shown on Figure 20 and the volumes shown on Figure 21, the intersections were analyzed for Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 levels of service. Figure 22 and Table 19 show the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 levels of service for the study intersections. The TWSC levels of service shown on Figure 22 are the levels of service for the worst approach at that intersection. The AWSC intersection levels of service shown in Figure 22 and in Table 19 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 22 and in Table 19. The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 intersection levels of service calculations are included in Appendix O.

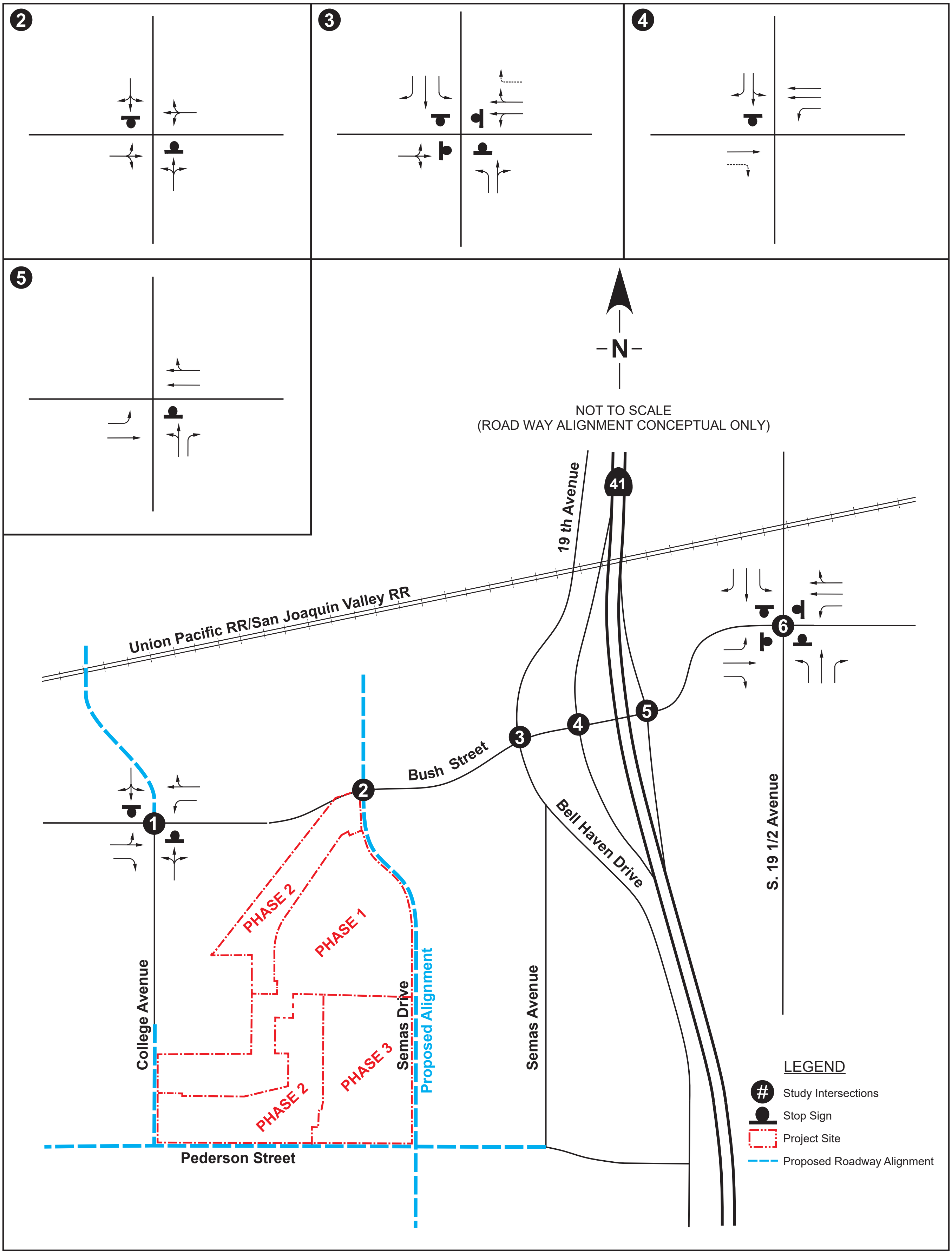
TABLE 19:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1
TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		PM Peak Hour	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	D	25.0	B	11.8
• **SB Approach**	**F**	**280.6**	D	26.8
Bush Street at Semas Avenue				
• NB Approach	D	25.8	C	19.6
• SB Approach	C	16.0	B	11.3
Bush Street at Belle Haven Drive	**F**	**93.6**	C	19.6
Bush Street at SR 41 SB Ramps				
• **SB Approach**	**F**	**247.0**	D	32.3
Bush Street at SR 41 NB Ramps				
• **NB Approach**	**F**	**82.0**	C	19.2
Bush Street at 19 ½ Avenue	D	29.0	B	13.4

[1] Delay per vehicle *secs = seconds* *SR = State Route* *EB = eastbound*
WB = westbound *NB = northbound* *SB = southbound* *$ = delay exceeds 300 seconds*

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 19. As shown in Figure 22 and Table 19, the following locations by time period are projected to operate below the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 scenario:

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour



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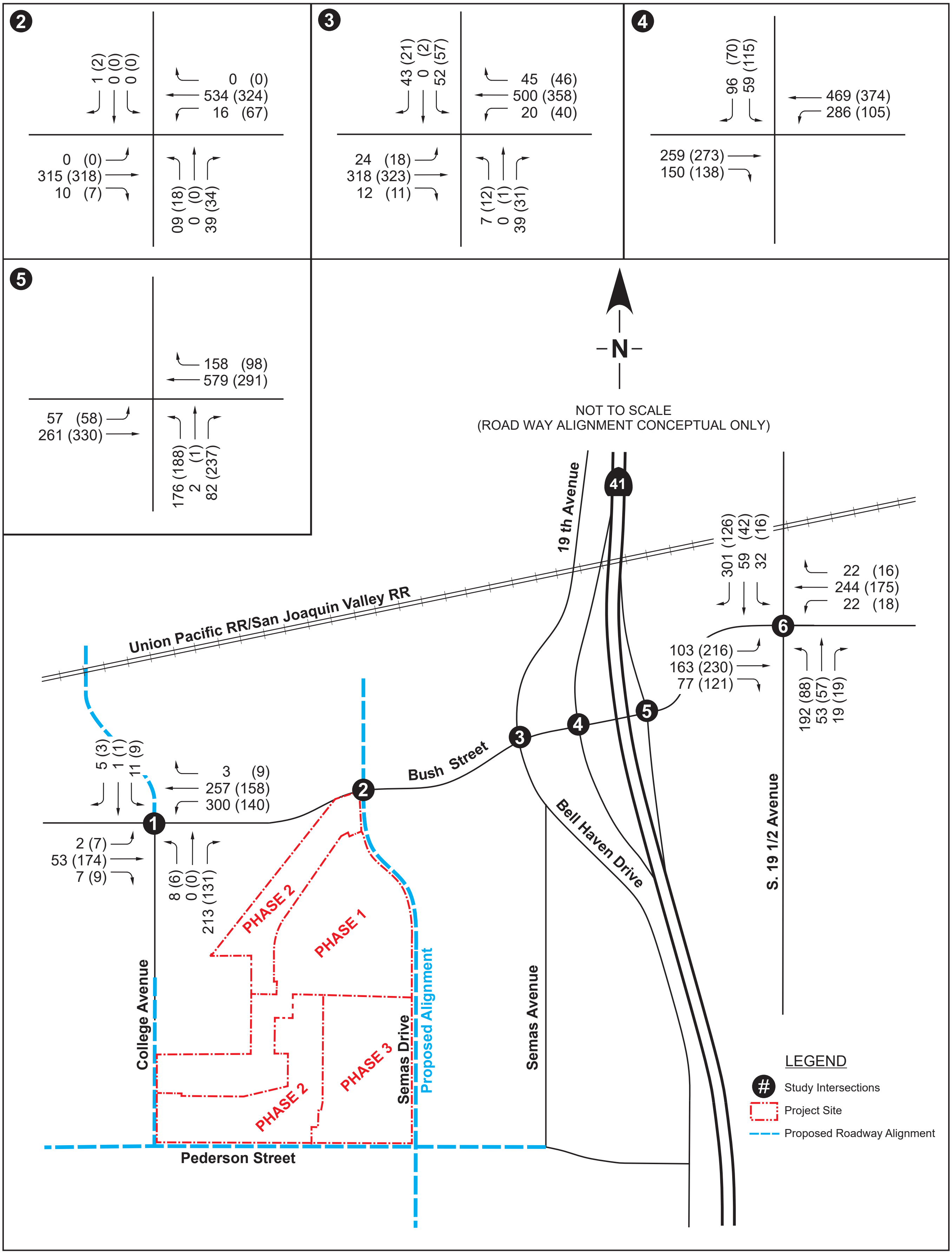
LANE CONFIGURATIONS AND INTERSECTION CONTROL

Existing (2018) + Approved/Pending/Proposed Projects + Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 20



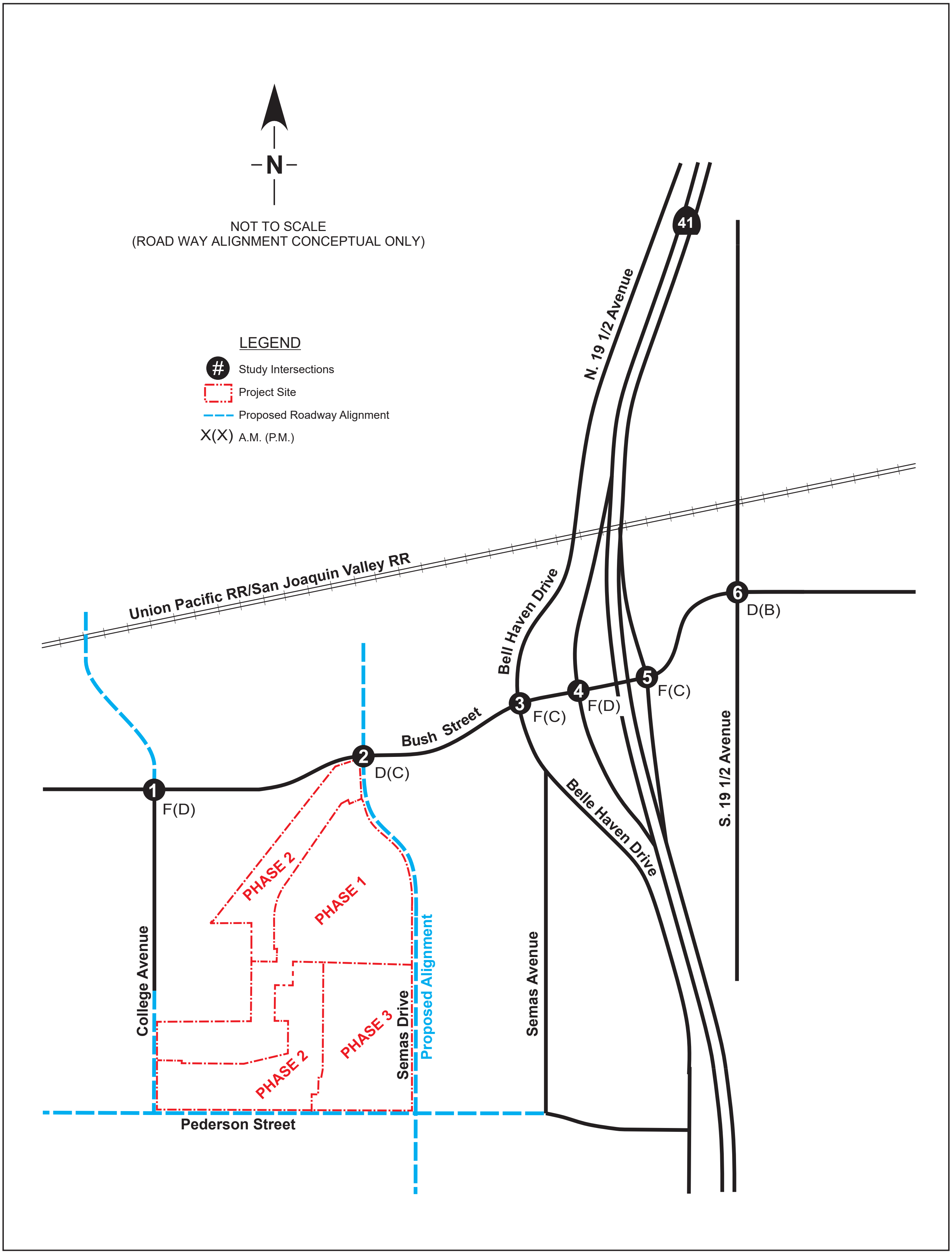
ND Engineering, PC

INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018) + Approved/Pending/Proposed + Project
(Phase 1 - 155 DU)

City of Lemoore, California

Figure 21



Engineering, PC

INTERSECTION LEVEL OF SERVICE

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1 - 155 DU)

City of Lemoore, California

Figure 22

- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 scenario.

Signal Warrant Analysis

Urban peak hour volume signal warrants were prepared for the following intersections:

- Bush Street at College Avenue
- Bush Street at Semas Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB Ramps
- Bush Street at SR 41 NB Ramps
- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is met at the Bush Street at SR 41 NB ramp intersection. The urban peak hour volume warrant is not met at any of the remaining unsignalized intersections in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 scenario.

This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix P.

Queue Lengths

Queuing analyses were performed at all study intersections. Table 20 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 95th percentile queue lengths developed from the level of service analyses.

TABLE 20:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1
TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	38	15
Bush Street at Belle Haven Drive			
• NB Left	50	3	3
• SB Left	75	18	15
• SB Right	75	13	5
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	208	83
• SB Right	466[3]	18	8

TABLE 20:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1
TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• EB Right	75	0	0
• WB Left	249	50	10
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	250	80
• NB Right	300[3]	15	45
• EB Left	114	10	5
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**155**	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	195	25
• EB Left	400	68	68
• EB Right	400	35	23
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 20. As shown in Table 20, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 scenario:

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 scenario.

MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 TRAFFIC CONDITIONS

Impacts

Based on the information provided in the previous sections, the following locations, by scenario, are projected to operate below the appropriate adopted level of service standard:

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour

- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

The following locations by scenario are projected to meet the urban peak hour volume signal warrant:

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at SR 41 NB Ramps

The following locations by scenario and time period are also projected to have queue storage length exceedances:

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard, meet the urban peak hour volume signal warrant, or exceed the available storage lengths in the 95th percentile condition, two (2) alternative set of improvements are recommended in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 scenario. The two (2) set of alternatives differ at the Bush Street and College Avenue intersection and the Bush Street at Semas Drive intersection mitigations with the remaining intersection mitigations the same. The two (2) alternatives are referred to as Alternative A and Alternative B and include the following:

- Bush Street at College Avenue (Alternative A)
    - Convert the northbound approach from a shared left-through-right lane to a shared left-through lane and a separate right-turn lane
    - Convert the eastbound approach from a shared left-through and a separate right-turn lane to a shared left-through and a shared through-right lane
    - Convert the westbound approach from a separate left-turn lane and a shared through-right lane to a separate left-turn lane, one (1) through, and a shared through-right lane

- Bush Street at College Avenue (Alternative B)
    - Convert the intersection from a TWSC intersection to a single lane roundabout with shared left-through-right lanes on all approaches

- Bush Street at Semas Drive (Alternative A)
  - Convert the eastbound approach from a shared left-through-right to a separate left-through and a separate through-right lane
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line
- Bush Street at Semas Drive (Alternative B)
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line
- Bush Street at SR 41 NB Ramps (Alternative A or B)
  - Signalize the intersection

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive (Alternative A or B)
  - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
  - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
  - Construct an eastbound 75 feet left-turn pocket
  - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
  - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket
- Bush Street at SR 41 SB Ramps (Alternative A or B)
  - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections
- Bush Street at SR 41 NB Ramps (Alternative A or B)
  - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections
- Bush Street at 19 ½ Avenue (Alternative A or B)
  - Convert the westbound separate left-turn, separate through, separate right-turn lane to a separate left-turn, one (1) through, and one through-right-turn lane
  - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

The mitigated study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project and are shown in Figure 23 (Alternative A) or Figure 25 (Alternative B).

Intersection Level Of Service Analysis (Alternative A)

The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) intersection lane configurations and intersection controls are shown on Figure 23. Using the lane configurations shown on Figure 23 and the volumes shown on Figure 21, the intersections were analyzed for Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) levels of service. Figure 24 and Table 21 show the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) levels of service for the study intersections. The TWSC levels of service shown on Figure 24 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 24 and in Table 21 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 24 and in Table 21. The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) intersection levels of service calculations are included in Appendix Q.

TABLE 21:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 (ALTERNATIVE A) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

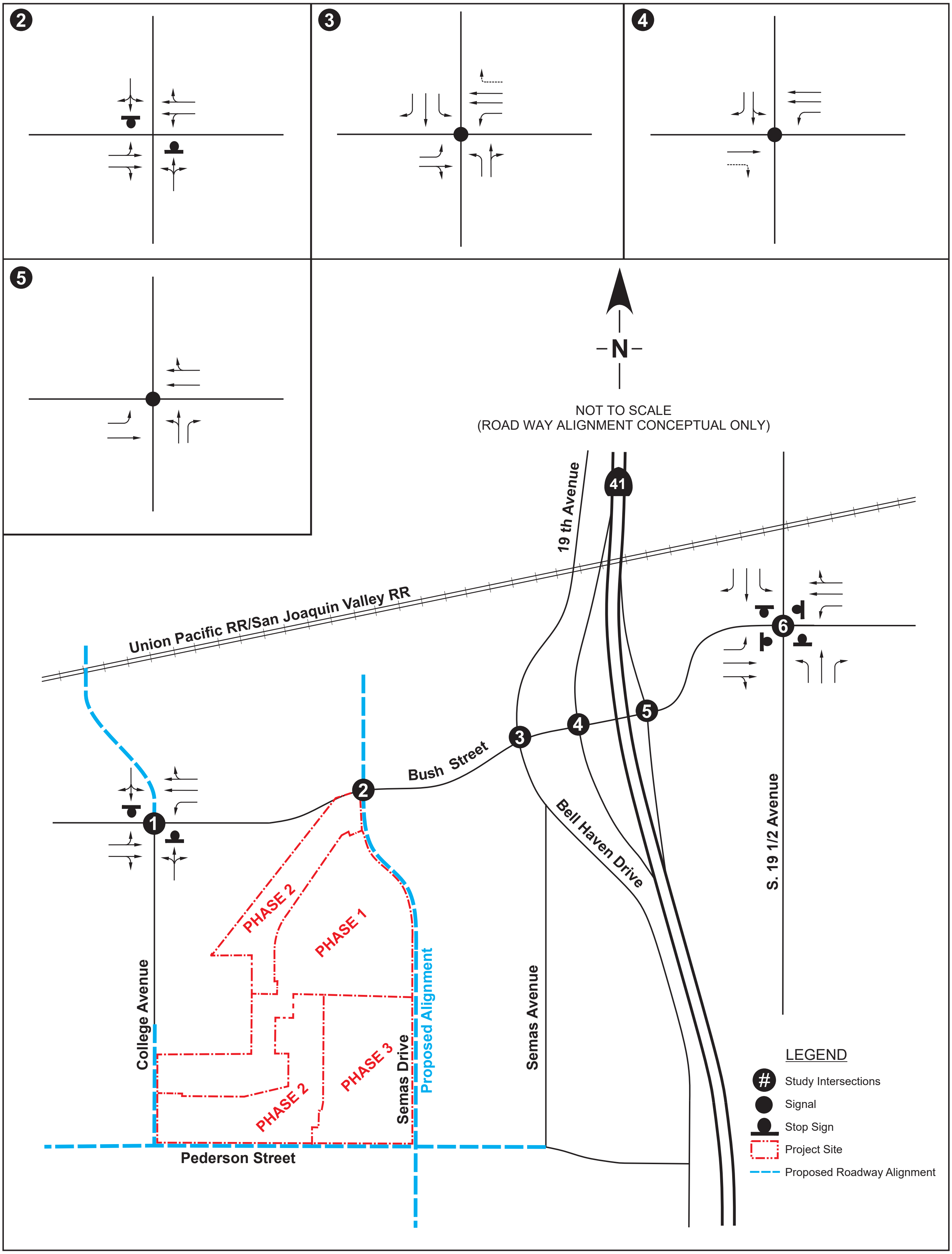
Intersection	**AM Peak Hour**		**PM Peak Hour**	
	LOS	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	B	13.3	B	10.5
• **SB Approach**	**F**	**171.1**	C	21.8
Bush Street at Semas Avenue				
• NB Approach	C	15.9	C	15.5
• SB Approach	B	11.6	A	9.8
Bush Street at Belle Haven Drive	D	51.2	C	29.5
Bush Street at SR 41 SB Ramps	C	24.5	B	12.6
Bush Street at SR 41 NB Ramps	C	21.5	B	14.4
Bush Street at 19 ½ Avenue	D	27.1	B	13.7

[1] Delay per vehicle secs = seconds SR = State Route NB = northbound SB = southbound

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 21. As shown in Figure 24 and Table 21, the following locations by time period are projected to operate below the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) scenario:

- Bush Street at College Avenue
  - SB Approach – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) scenario.



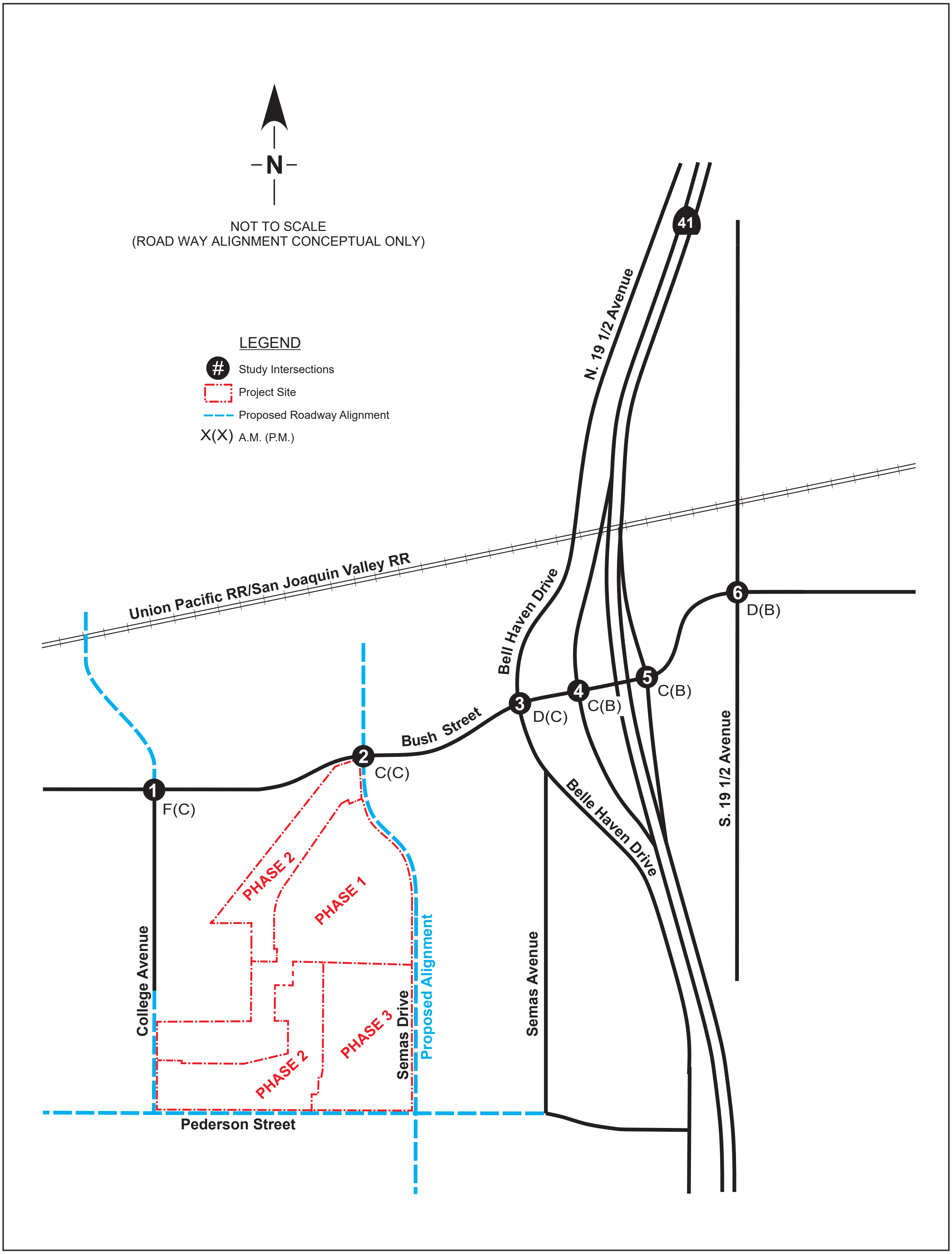
ND Engineering, PC

MITIGATED LANE CONFIGURATIONS AND INTERSECTION CONTROL (ALTERNATIVE A)

Existing (2018) + Approved/Pending/Proposed Projects
+ Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 23



MITIGATED INTERSECTION LEVEL OF SERVICE (ALTERNATIVE A)

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1 - 155 DU)

ND Engineering, PC

City of Lemoore, California

Figure 24

Queue Lengths (Alternative A)

Queuing analyses were performed at all study intersections. Table 22 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) 95th percentile queue lengths developed from the level of service analyses.

TABLE 22:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 (ALTERNATIVE A) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	38	15
Bush Street at Belle Haven Drive			
• NB Left	50	14	27
• **SB Left**	**75**	57	**75**
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	54	48
• SB Right	466[3]	23	18
• EB Right	75	0	13
• WB Left	249	248	52
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	127	78
• NB Right	300[3]	20	34
• EB Left	114	37	19
Bush Street at 19 ½ Avenue			
• NB Left	175	155	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	195	25
• EB Left	400	68	68
• EB Right	400	90	48
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to meet or exceed the available and recommended storage lengths are shown bolded in Table 22. As shown in Table 22, the following intersection queue lengths, by time period, are projected to meet or exceed the available and recommended storage lengths in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) scenario:

- Bush Street at Belle Haven Drive
    - SB left – PM peak hour

The Bush Street at Belle Haven Drive southbound left-turn is projected to meet the available storage length. Therefore, it is recommended that the Bush Street at Belle Haven Drive southbound left-turn lane be lengthened to 100 feet to avoid possible exceedances. Otherwise, the 95th percentile queue may exceed the storage pocket length and the left-turns would extend into the through lane and potentially block through traffic. The remaining analyzed intersection queue lengths are not projected to exceed the available and recommended storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative A) scenario.

Intersection Level Of Service Analysis (Alternative B)

The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) intersection lane configurations and intersection controls are shown on Figure 25. Using the lane configurations shown on Figure 25 and the volumes shown on Figure 21, the intersections were analyzed for Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative B) levels of service. Figure 26 and Table 23 show the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative B) levels of service for the study intersections. The TWSC levels of service shown on Figure 26 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 26 and in Table 23 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 26 and in Table 23. The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative B) intersection levels of service calculations are included in Appendix R.

TABLE 23:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 (ALTERNATIVE B) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

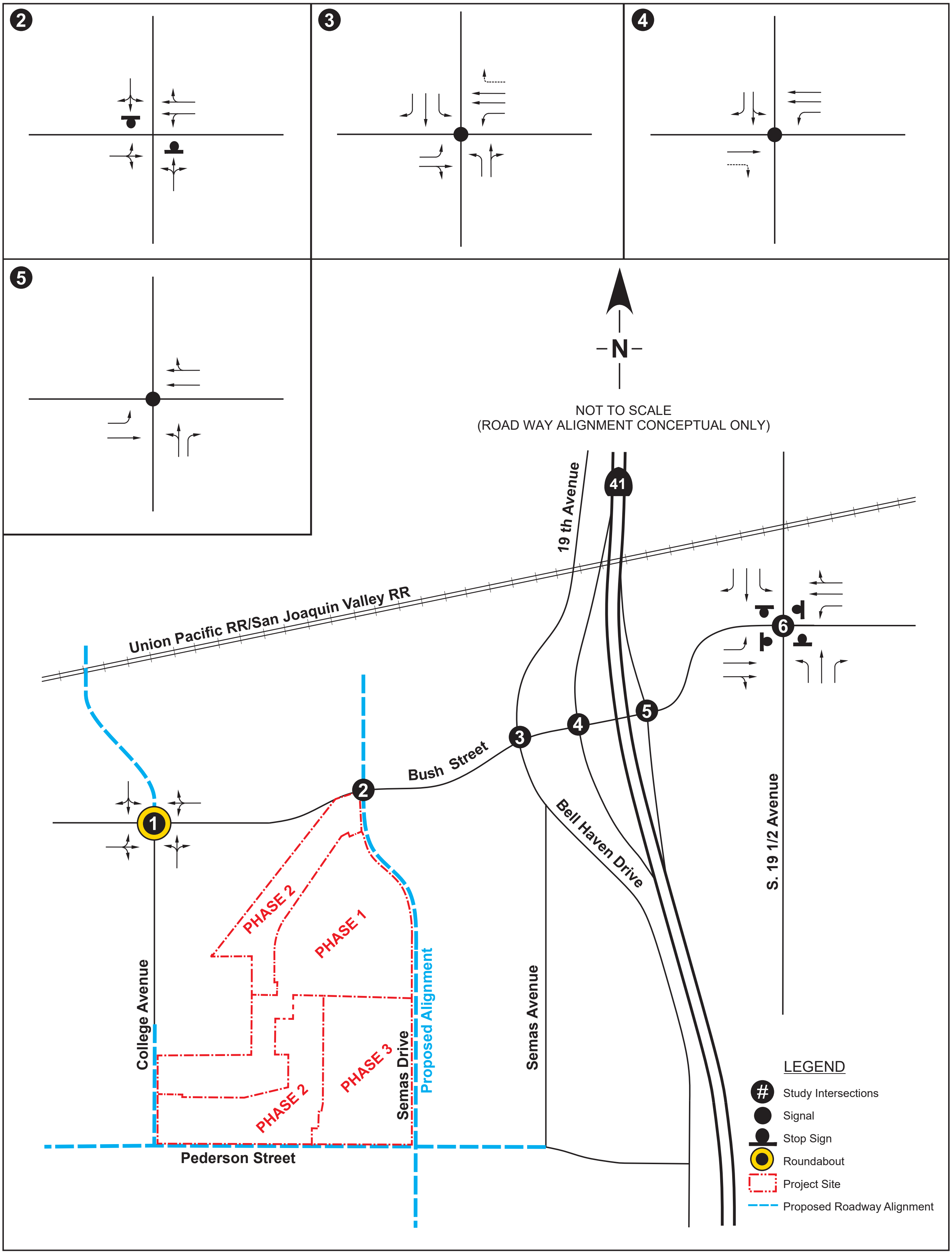
Intersection	**AM Peak Hour**		**PM Peak Hour**	
	LOS	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive	B	10.8	A	5.6
Bush Street at Semas Avenue				
• NB Approach	C	18.2	C	16.2
• SB Approach	B	11.6	A	9.8
Bush Street at Belle Haven Drive	D	51.2	C	29.5
Bush Street at SR 41 SB Ramps	C	24.5	B	12.6
Bush Street at SR 41 NB Ramps	C	21.5	B	14.4
Bush Street at 19 ½ Avenue	D	27.1	B	13.4

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

As shown in Figure 26 and Table 23, with the proposed mitigations all study intersections are projected to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative B) scenario.

Queue Lengths (Alternative B)

Table 24 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative B) 95th percentile queue lengths developed from the level of service analyses.



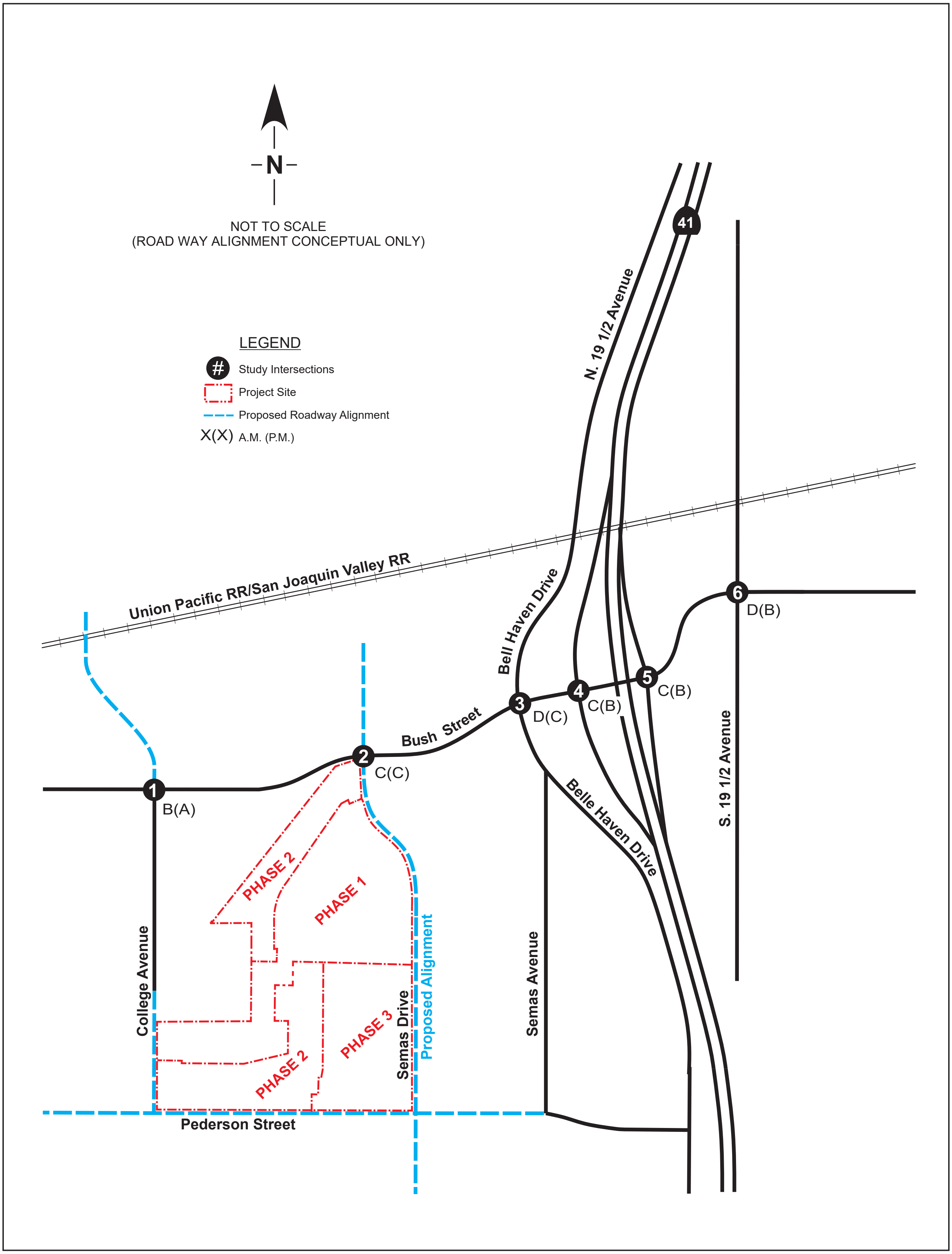
Engineering, PC

MITIGATED LANE CONFIGURATIONS AND INTERSECTION CONTROL (ALTERNATIVE B)

Existing (2018) + Approved/Pending/Proposed Projects
+ Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 25



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MITIGATED INTERSECTION LEVEL OF SERVICE (ALTERNATIVE B)

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1 - 155 DU)

City of Lemoore, California

Figure 26

TABLE 24:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 (ALTERNATIVE B) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	na	na
• WB Left	394	na	na
Bush Street at Belle Haven Drive			
• NB Left	50	14	27
• **SB Left**	**75**	57	**75**
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	54	48
• SB Right	466[3]	23	18
• EB Right	75	0	13
• **WB Left**	**249**	**248**	52
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	127	78
• NB Right	300[3]	20	34
• EB Left	114	37	19
Bush Street at 19 ½ Avenue			
• NB Left	175	155	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	195	25
• EB Left	400	68	68
• EB Right	400	90	23
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
n/a = does not exist in this scenario

Intersection queue lengths projected to meet or exceed the available and recommended storage lengths are shown bolded in Table 24. As shown in Table 24, the following intersection queue lengths, by time period, are projected to meet or exceed the available and recommended storage lengths in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative B) scenario:

- Bush Street at Belle Haven Drive
    - SB left – PM peak hour
- Bush Street at SR 41 SB ramps
    - WB left – AM peak hour

The Bush Street at Belle Haven Drive southbound left-turn and the Bush Street at SR 41 SB Ramp westbound left-turn are projected to meet the available storage lengths. Therefore, it is recommended that these two (2) turn pockets be lengthened to the following lengths:

- Bush Street at Belle Haven Drive
    - SB left – lengthened from 75 feet to 100 feet
- Bush Street at SR 41 SB ramps
    - WB left – lengthened from 249 feet to 275 feet

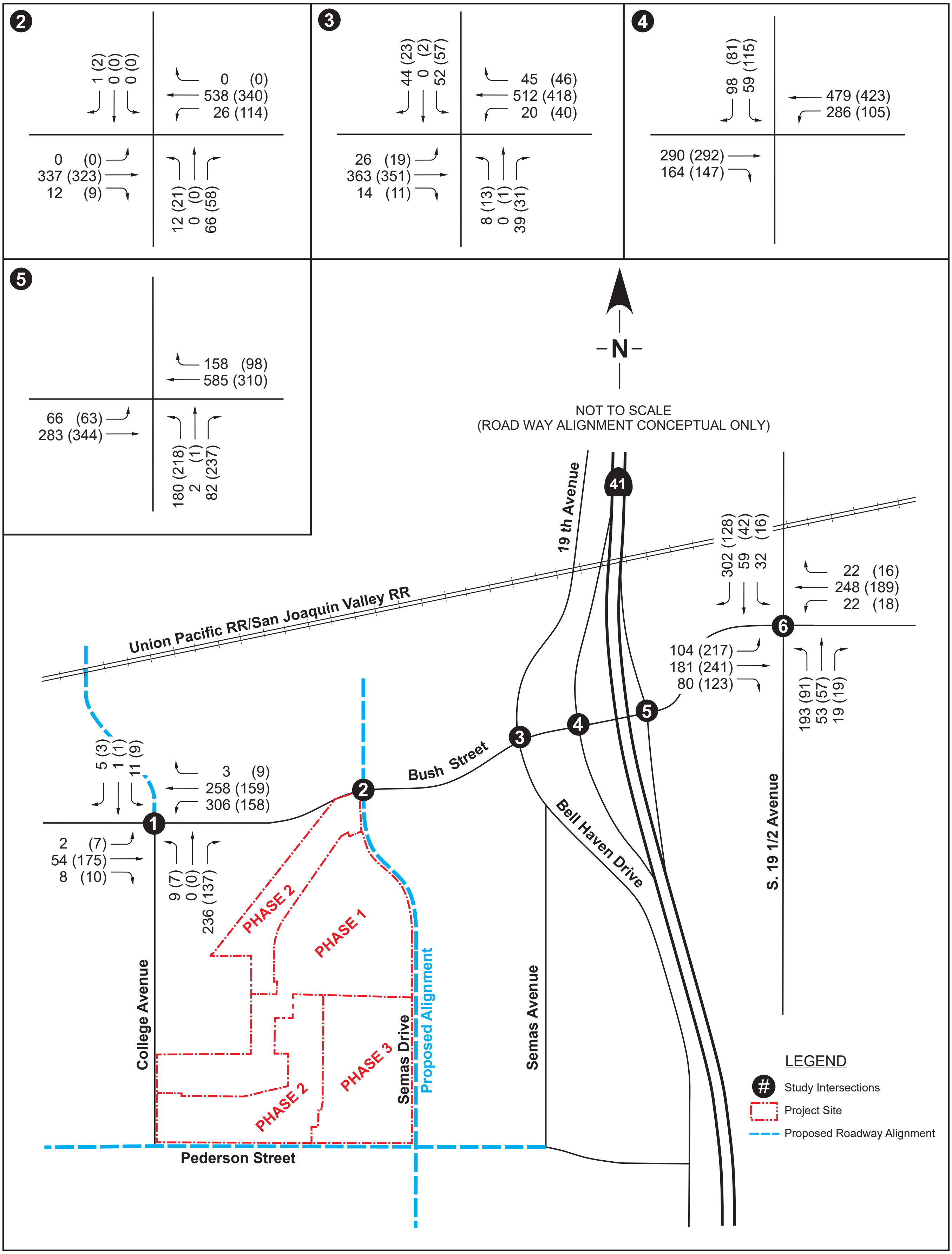
Otherwise, these two (2) locations 95th percentile queues may exceed the storage pocket lengths and the left-turns would extend into the through lane and potentially block through traffic. The remaining analyzed intersection queue lengths are not projected to exceed the available storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (Alternative B) scenario.

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS

With construction of the entire project, Semas Avenue would be constructed on a new alignment as the eastern boundary, Pederson Street would be constructed as the southern boundary, and College Avenue would be extended south to Pederson Street. Phase 1 and 2 construction of these surrounding streets would include the construction of Semas Avenue to the Phase 1 neighborhood entry point, the extension of College Avenue to the Pederson Street alignment, and the construction of Pederson Street to the Phase 2 neighborhood entry point. The study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project and are shown in Figure 20.

Intersection Level Of Service Analysis

The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 20. The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 intersection peak hour traffic volumes are shown on Figure 27. Using the lane configurations shown on Figure 20 and the volumes shown on Figure 27, the intersections were analyzed for Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 levels of service. Figure 28 and Table 25 show the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 levels of service for the study intersections. The TWSC levels of service shown on Figure 28 are the levels of service for the worst approach at that intersection. The AWSC intersection levels of service shown in Figure 28 and in Table 25 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 28 and in Table 25. The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 intersection levels of service calculations are included in Appendix S.



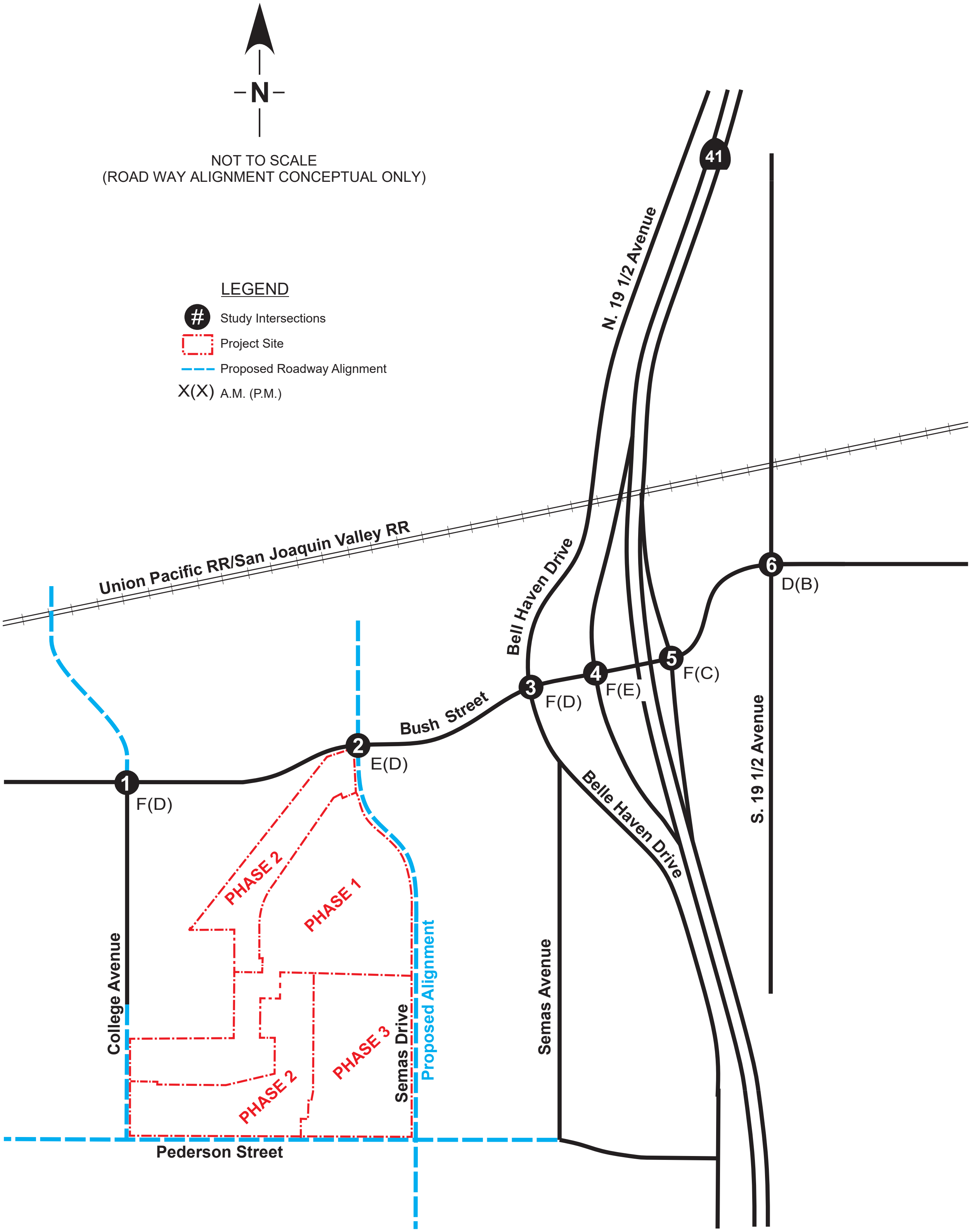
ND Engineering, PC

INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018) + Approved/Pending/Proposed + Project
(Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure 27



ND Engineering, PC

INTERSECTION LEVEL OF SERVICE

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure 28

TABLE 25:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	D	34.1	B	12.3
• **SB Approach**	**F**	**$361.5**	D	30.2
Bush Street at Semas Avenue				
• **NB Approach**	**E**	**36.2**	D	25.4
• SB Approach	C	16.1	B	11.5
Bush Street at Belle Haven Drive	**F**	**134.4**	D	25.2
Bush Street at SR 41 SB Ramps				
• **SB Approach**	**F**	**$306.2**	**E**	**38.1**
Bush Street at SR 41 NB Ramps				
• **NB Approach**	**F**	**124.3**	C	23.8
Bush Street at 19 ½ Avenue	D	32.6	B	13.9

[1] Delay per vehicle secs = seconds SR = State Route EB = eastbound
WB = westbound NB = northbound SB = southbound $ = delay exceeds 300 seconds

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 25. As shown in Figure 28 and Table 25, the following locations by time period are projected to operate below the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 scenario:

- Bush Street at College Avenue
  - SB Approach – AM peak hour
- Bush Street at Semas Avenue
  - NB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
  - SB Approach – AM/PM peak hour
- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 scenario.

Signal Warrant Analysis

Urban peak hour volume signal warrants were prepared for the following intersections:

- Bush Street at College Avenue
- Bush Street at Semas Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB Ramps
- Bush Street at SR 41 NB Ramps

- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is met at the Bush Street at SR 41 NB ramp intersection. The urban peak hour volume warrant is not met at any of the remaining unsignalized intersections in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 and 2 scenario.

This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix T.

Queue Lengths

Queuing analyses were performed at all study intersections. Table 26 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 95th percentile queue lengths developed from the level of service analyses.

TABLE 26:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
- EB Right	80	0	0
- WB Left	394	40	18
Bush Street at Belle Haven Drive			
- NB Left	50	3	3
- SB Left	75	18	15
- SB Right	75	13	5
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
- SB Left-Through	466[3]	220	98
- SB Right	466[3]	18	10
- EB Right	75	0	0
- WB Left	249	55	10
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
- **NB Left-Through**	**300[3]**	**313**	118
- NB Right	300[3]	18	48
- EB Left	114	13	5
Bush Street at 19 ½ Avenue			
- **NB Left**	**48**	**163**	20
- NB Right	50	5	3
- SB Left	106	8	3
- SB Right	354	205	28
- EB Left	400	70	70
- EB Right	400	38	23
- WB Left	49	5	3

TABLE 26:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 26. As shown in Table 26, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 scenario:

- Bush Street at SR 41 NB Ramps
  - NB left-through – AM peak hour
- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 scenario.

MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 TRAFFIC CONDITIONS

Impacts

Based on the information provided in the previous sections, the following locations, by scenario, are projected to operate below the appropriate adopted level of service standard:

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at College Avenue
  - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
  - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at College Avenue
  - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
  - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at College Avenue
  - SB Approach – AM peak hour
- Bush Street at Semas Avenue
  - NB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
  - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
  - NB Approach – AM peak hour

The following locations by scenario are projected to meet the urban peak hour volume signal warrant:

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

The following locations by scenario and time period are also projected to have queue storage length exceedances:

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps
  - NB left-through – AM peak hour
- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard, meet the urban peak hour volume signal warrant, or exceed the available storage lengths in the 95th percentile condition, two (2) alternative set of improvements are recommended in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 scenario. The two (2) set of alternatives differ at the Bush Street and College Avenue intersection and the Bush Street at Semas Drive intersection mitigations with the remaining intersection mitigations the same. The two (2) alternatives are referred to as Alternative A and Alternative B and include the following:

- Bush Street at College Avenue (Alternative A)
  - Convert the northbound approach from a shared left-through-right lane to a shared left-through lane and a separate right-turn lane
  - Convert the eastbound approach from a shared left-through and a separate right-turn lane to a shared left-through and a shared through-right lane
  - Convert the westbound approach from a separate left-turn lane and a shared through-right lane to a separate left-turn lane, one (1) through, and a shared through-right lane

- Bush Street at College Avenue (Alternative B)
    - Convert the intersection from a TWSC intersection to a single lane roundabout with shared left-through-right lanes on all approaches

- Bush Street at Semas Drive (Alternative A)
    - Convert the eastbound approach from a shared left-through-right to a separate left-through and a separate through-right lane
    - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line

- Bush Street at Semas Drive (Alternative B)
    - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line

- Bush Street at SR 41 NB Ramps (Alternative A or B)
    - Signalize the intersection

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive (Alternative A or B)
    - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
    - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
    - Construct an eastbound 75 feet left-turn pocket
    - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
    - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket

- Bush Street at SR 41 SB Ramps (Alternative A or B)
    - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections

- Bush Street at SR 41 NB Ramps (Alternative A or B)
    - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections

- Bush Street at 19 ½ Avenue (Alternative A or B)
    - Convert the westbound separate left-turn, separate through, separate right-turn lane to a separate left-turn, one (1) through, and one through-right-turn lane
    - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

The mitigated study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project and are shown in Figure 23 (Alternative A) and Figure 25 (Alternative B).

Intersection Level Of Service Analysis (Alternative A)

The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) intersection lane configurations and intersection controls are shown on Figure 23. Using the lane configurations shown on Figure 23 and the volumes shown on Figure 27, the intersections were analyzed for Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative A) levels of service. Figure 29 and Table 27 show the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative A) levels of service for the study intersections. The TWSC levels of service shown on Figure 29 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 29 and in Table 27 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 29 and in Table 27. The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project (Alternative A) intersection levels of service calculations are included in Appendix U.

TABLE 27:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 (ALTERNATIVE A) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

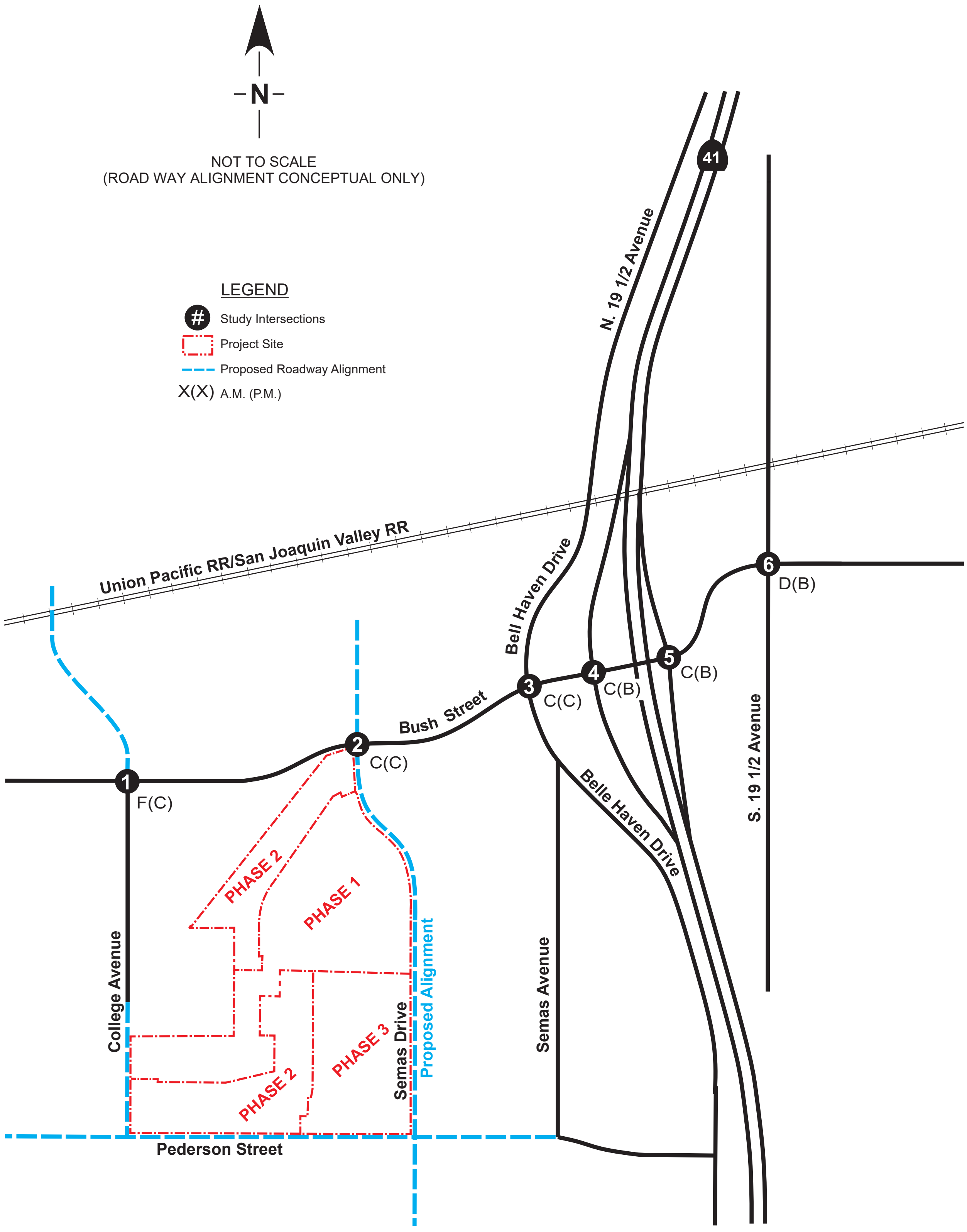
	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	B	14.2	B	10.7
• **SB Approach**	**F**	**215.1**	C	24.1
Bush Street at Semas Avenue				
• NB Approach	C	18.6	C	18.6
• SB Approach	B	11.6	A	9.9
Bush Street at Belle Haven Drive	C	33.5	C	28.7
Bush Street at SR 41 SB Ramps	C	25.9	B	12.4
Bush Street at SR 41 NB Ramps	C	23.9	B	14.3
Bush Street at 19 ½ Avenue	D	29.0	B	13.4

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 27. As shown in Figure 29 and Table 27, the following locations by time period are projected to operate below the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative A) scenario:

- Bush Street at College Avenue
    - SB Approach – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative A) scenario.



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MITIGATED INTERSECTION LEVEL OF SERVICE (ALTERNATIVE A)

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure 29

Queue Lengths (Alternative A)

Queuing analyses were performed at all study intersections. Table 28 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative A) 95th percentile queue lengths developed from the level of service analyses.

TABLE 28:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 (ALTERNATIVE A) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	40	18
Bush Street at Belle Haven Drive			
• NB Left	50	16	29
• **SB Left**	**75**	63	**76**
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	63	49
• SB Right	466[3]	25	20
• EB Right	75	0	18
• **WB Left**	**249**	**265**	50
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	144	91
• NB Right	300[3]	22	34
• EB Left	114	53	19
Bush Street at 19 ½ Avenue			
• NB Left	175	163	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	205	28
• EB Left	400	70	70
• EB Right	400	105	50
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available and recommended storage lengths are shown bolded in Table 28. As shown in Table 28, the following intersection queue lengths, by time period, are projected to exceed the available and recommended storage lengths in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative A) scenario:

- Bush Street at Belle Haven Drive
    - SB left – PM peak hour

- Bush Street at SR 41 SB Ramps
    - WB Left – AM peak hour

The Bush Street at Belle Haven Drive southbound left-turn and the Bush Street at SR 41 SB Ramp westbound left-turn are projected to exceed the available storage lengths. Therefore, it is recommended that these two (2) turn pockets be lengthened to the following lengths:

- Bush Street at Belle Haven Drive
    - SB left – lengthened from 75 feet to 100 feet
- Bush Street at SR 41 SB ramps
    - WB left – lengthened from 249 feet to 275 feet

Otherwise, these two (2) locations 95th percentile queues may exceed the storage pocket lengths and the left-turns would extend into the through lane and potentially block through traffic. The remaining analyzed intersection queue lengths are not projected to exceed the available and recommended storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (Alternative A) scenario.

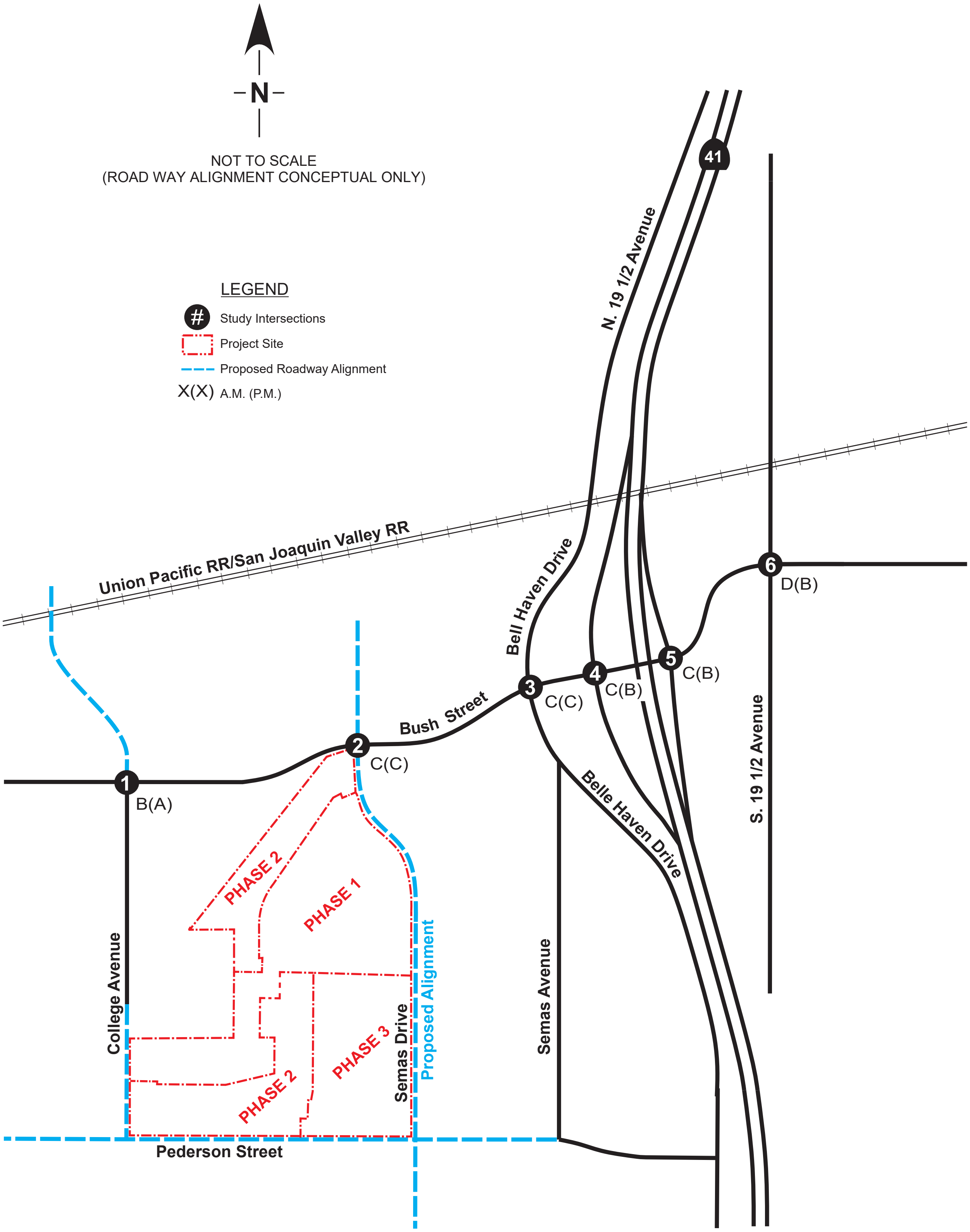
Intersection Level Of Service Analysis (Alternative B)

The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) intersection lane configurations and intersection controls are shown on Figure 25. Using the lane configurations shown on Figure 25 and the volumes shown on Figure 27, the intersections were analyzed for Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative B) levels of service. Figure 30 and Table 29 show the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative B) levels of service for the study intersections. The TWSC levels of service shown on Figure 30 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 30 and in Table 29 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 30 and in Table 29. The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative B) intersection levels of service calculations are included in Appendix V.

TABLE 29:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 (ALTERNATIVE B) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		PM Peak Hour	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive	B	11.1	A	5.8
Bush Street at Semas Avenue				
• NB Approach	C	22.7	C	19.6
• SB Approach	B	11.6	A	9.9
Bush Street at Belle Haven Drive	C	33.5	C	28.7
Bush Street at SR 41 SB Ramps	C	25.9	B	12.4
Bush Street at SR 41 NB Ramps	C	23.9	B	14.3
Bush Street at 19 ½ Avenue	D	29.0	B	13.9

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound



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MITIGATED INTERSECTION LEVELS OF SERVICE (ALTERNATIVE B)

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure 30

As shown in Figure 30 and Table 29, with the proposed mitigations all study intersections are projected to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative B) scenario.

Queue Lengths (Alternative B)

Table 30 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative B) 95th percentile queue lengths developed from the level of service analyses.

TABLE 30:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 (ALTERNATIVE B) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	na	na
• WB Left	394	na	na
Bush Street at Belle Haven Drive			
• NB Left	50	16	29
• **SB Left**	**75**	63	**76**
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	63	49
• SB Right	466[3]	25	20
• EB Right	75	0	18
• **WB Left**	**249**	**265**	50
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	144	91
• NB Right	300[3]	22	34
• EB Left	114	53	19
Bush Street at 19 ½ Avenue			
• NB Left	175	163	20
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	205	28
• EB Left	400	70	70
• EB Right	400	105	23
• WB Left	49	5	3
• WB Right	95	35	15

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
n/a = does not exist in this scenario

Intersection queue lengths projected to exceed the available and recommended storage lengths are shown bolded in Table 30. As shown in Table 30, the following intersection queue lengths, by time period, are projected to exceed the available and recommended storage lengths in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative B) scenario:

- Bush Street at Belle Haven Drive
    - SB left – PM peak hour
- Bush Street at SR 41 SB ramps
    - WB left – AM peak hour

The Bush Street at Belle Haven Drive southbound left-turn and the Bush Street at SR 41 SB Ramp westbound left-turn are projected to exceed the available storage lengths. Therefore, it is recommended that these two (2) turn pockets be lengthened to the following lengths:

- Bush Street at Belle Haven Drive
    - SB left – lengthened from 75 feet to 100 feet
- Bush Street at SR 41 SB ramps
    - WB left – lengthened from 249 feet to 275 feet

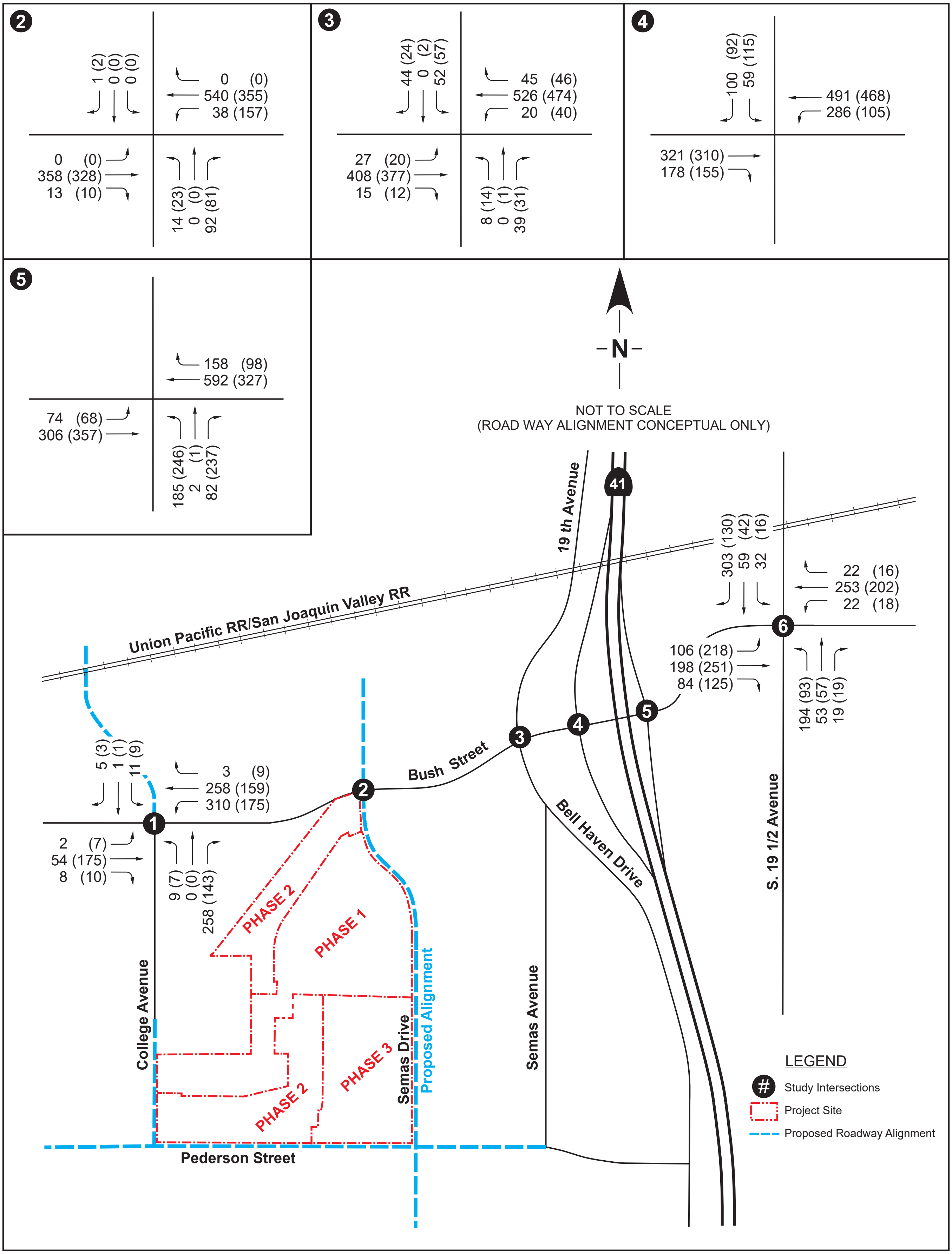
Otherwise, these two (2) locations 95th percentile queues may exceed the storage pocket lengths and the left-turns would extend into the through lane and potentially block through traffic. The remaining analyzed intersection queue lengths are not projected to exceed the available storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 (Alternative B) scenario.

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS

With construction of the project, Semas Avenue would be constructed on a new alignment as the eastern boundary, Pederson Street would be constructed as the southern boundary, and College Avenue would be extended south to Pederson Street. Phase 1, 2, and 3 construction would complete construction of all three (3) boundary streets. The study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project and are shown in Figure 20.

Intersection Level Of Service Analysis

The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 intersection lane configurations and intersection controls are shown on Figure 20. The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 intersection peak hour traffic volumes are shown on Figure 31. Using the lane configurations shown on Figure 20 and the volumes shown on Figure 31, the intersections were analyzed for Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 levels of service. Figure 32 and Table 31 show the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 levels of service for the study intersections. The TWSC levels of service shown on Figure 32 are the levels of service for the worst approach at that intersection. The AWSC intersection levels of service shown in Figure 32 and in Table 31 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC level of service or delay shown on Figure 32 and in Table 31. The Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 intersection levels of service calculations are included in Appendix W.



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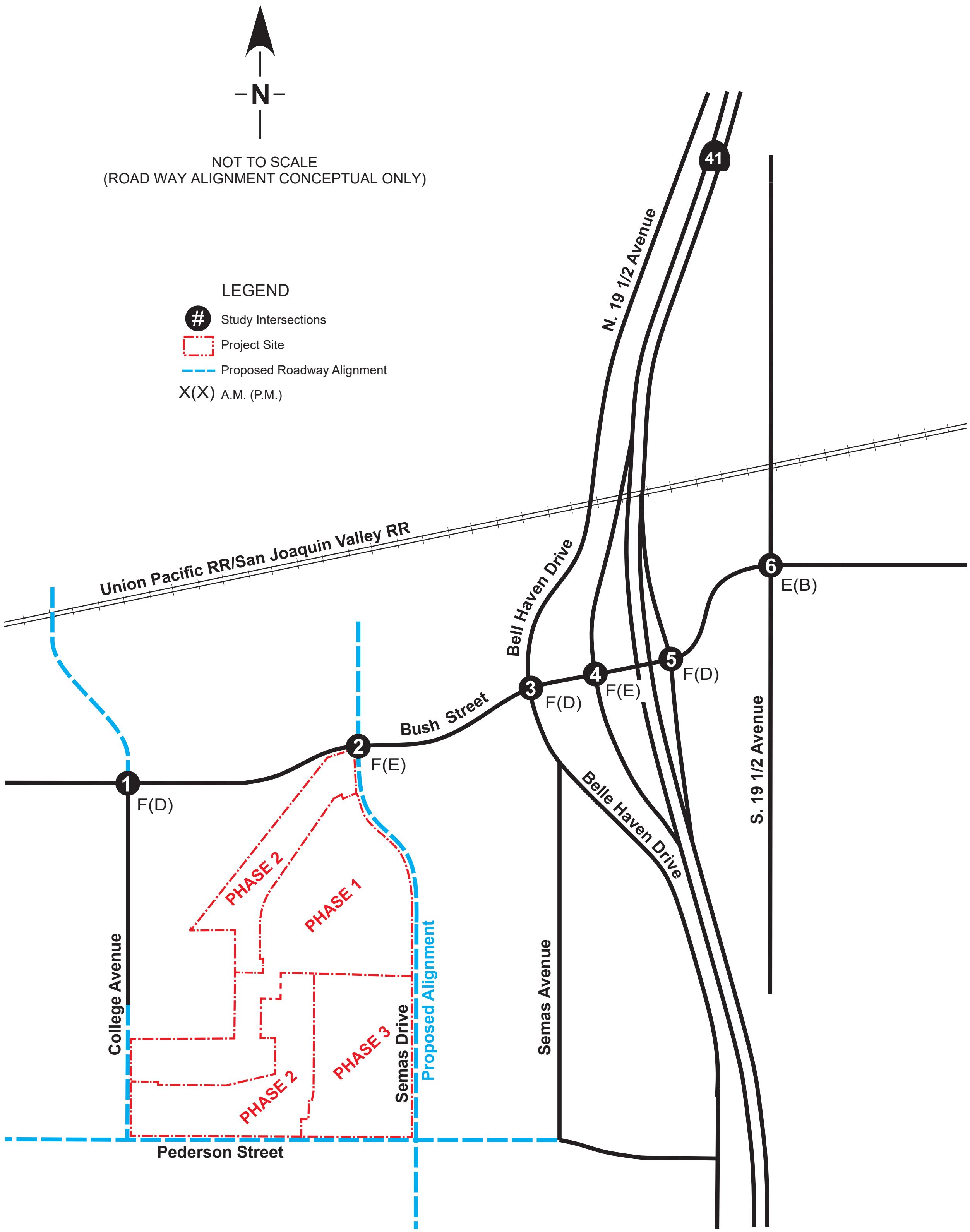
INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Existing (2018) + Approved/Pending/Proposed + Project
(Phase 1,2, & 3 - 370 DU)

City of Lemoore, California

Figure 31



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INTERSECTION LEVEL OF SERVICE

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 32

TABLE 31:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
- **NB Approach**	**E**	**42.0**	B	12.6
- **SB Approach**	**F**	**$481.8**	D	33.8
Bush Street at Semas Avenue				
- **NB Approach**	**F**	**62.3**	**E**	**38.2**
- SB Approach	C	16.2	B	11.7
Bush Street at Belle Haven Drive	**F**	**177.9**	D	33.7
Bush Street at SR 41 SB Ramps				
- **SB Approach**	**F**	**$389.3**	**E**	**46.3**
Bush Street at SR 41 NB Ramps				
- **NB Approach**	**F**	**182.6**	D	32.1
Bush Street at 19 ½ Avenue	**E**	**37.5**	B	14.3

[1] Delay per vehicle *secs = seconds* *SR = State Route* *EB = eastbound*
WB = westbound *NB = northbound* *SB = southbound* *$ = delay exceeds 300 seconds*

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 31. As shown in Figure 32 and Table 31, the following locations by time period are projected to operate below the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 scenario:

- Bush Street at College Avenue
    - NB Approach – PM peak hour
    - SB Approach – AM peak hour
- Bush Street at Semas Avenue
    - NB Approach – AM/PM peak hours
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour
- Bush Street at 19 ½ Avenue – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 scenario.

Signal Warrant Analysis

Urban peak hour volume signal warrants were prepared for the following intersections:

- Bush Street at College Avenue
- Bush Street at Semas Avenue
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB Ramps

- Bush Street at SR 41 NB Ramps
- Bush Street at 19 ½ Avenue

Based on the urban peak hour volume warrant, the warrant is met at the Bush Street at SR 41 NB ramp intersection. The urban peak hour volume warrant is not met at any of the remaining unsignalized intersections in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 scenario.

This warrant analysis is limited to the peak hour volume warrant only and other conditions may exist which meet other traffic signal warrants. Copies of the various warrant analyses are included in Appendix P.

Queue Lengths

Queuing analyses were performed at all study intersections. Table 32 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 95th percentile queue lengths developed from the level of service analyses.

TABLE 32:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3
TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	40	18
Bush Street at Belle Haven Drive			
• NB Left	50	3	3
• SB Left	75	18	18
• SB Right	75	13	5
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	235	115
• SB Right	466[3]	18	10
• EB Right	75	0	0
• WB Left	249	60	10
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• **NB Left-Through**	**300[3]**	**380**	170
• NB Right	300[3]	18	50
• EB Left	114	15	5
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**170**	23
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	218	28
• EB Left	400	75	73
• EB Right	400	43	25
• WB Left	49	5	3

TABLE 32:
EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3
TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• WB Right	95	38	18

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 32. As shown in Table 32, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 scenario:

- Bush Street at SR 41 NB Ramps
    - NB left-through – AM peak hour
- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

The remaining analyzed intersection queue lengths are not projected to exceed the Existing (2018) storage lengths in the 95th percentile condition in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 scenario.

MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 TRAFFIC CONDITIONS

Impacts

Based on the information provided in the previous sections, the following locations, by scenario, are projected to operate below the appropriate adopted level of service standard:

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Semas Avenue
    - NB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at College Avenue
    - NB Approach – PM peak hour
    - SB Approach – AM peak hour
- Bush Street at Semas Avenue
    - NB Approach – AM/PM peak hours
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour
- Bush Street at 19 ½ Avenue – AM peak hour

The following locations by scenario are projected to meet the urban peak hour volume signal warrant:

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps

The following locations by scenario and time period are also projected to have queue storage length exceedances:

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps
  - NB left-through – AM peak hour
- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps
  - NB left-through – AM peak hour
- Bush Street at 19 ½ Avenue
  - NB left – AM peak hour

To mitigate the intersections that are projected to operate below the appropriate adopted level of service standard, meet the urban peak hour volume signal warrant, or exceed the available storage lengths in the 95th percentile condition, two (2) alternative set of improvements are recommended in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 scenario. The two (2) set of alternatives differ at the Bush Street and College Avenue intersection and the Bush Street at Semas Drive intersection mitigations with the remaining intersection mitigations the same. The two (2) alternatives are referred to as Alternative A and Alternative B and include the following:

- Bush Street at College Avenue (Alternative A)
  - Convert the northbound approach from a shared left-through-right lane to a shared left-through lane and a separate right-turn lane
  - Convert the eastbound approach from a shared left-through and a separate right-turn lane to a shared left-through and a shared through-right lane
  - Convert the westbound approach from a separate left-turn lane and a shared through-right lane to a separate left-turn lane, one (1) through, and a shared through-right lane

- Bush Street at College Avenue (Alternative B)
  - Convert the intersection from a TWSC intersection to a single lane roundabout with shared left-through-right lanes on all approaches

- Bush Street at Semas Drive (Alternative A)
  - Convert the eastbound approach from a shared left-through-right to a separate left-through and a separate through-right lane
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line

- Bush Street at Semas Drive (Alternative B)
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line
- Bush Street at SR 41 NB Ramps (Alternative A or B)
  - Signalize the intersection

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive (Alternative A or B)
  - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
  - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
  - Construct an eastbound 75 feet left-turn pocket
  - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
  - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket

- Bush Street at SR 41 SB Ramps (Alternative A or B)
  - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections

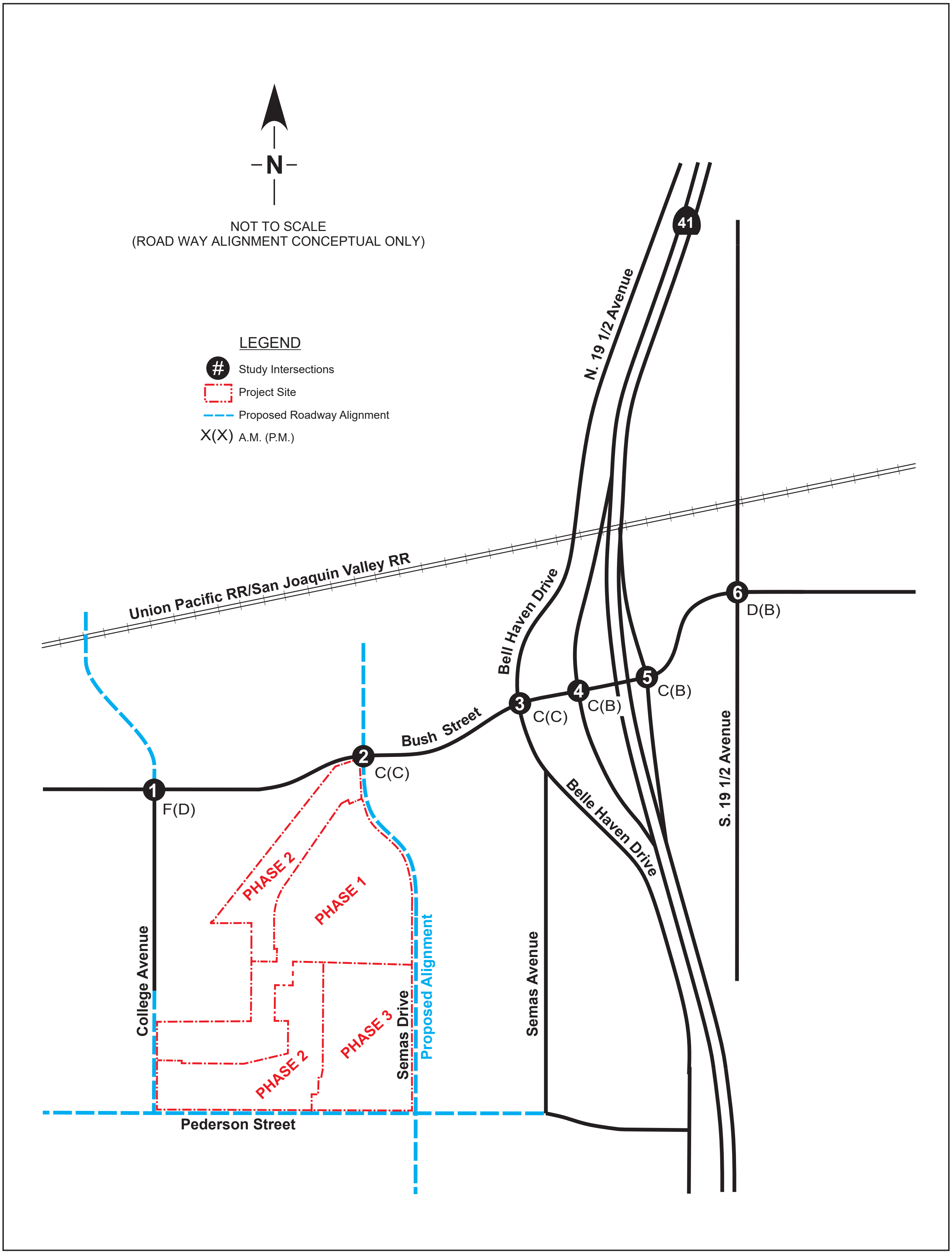
- Bush Street at SR 41 NB Ramps (Alternative A or B)
  - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections

- Bush Street at 19 ½ Avenue (Alternative A or B)
  - Convert the westbound separate left-turn, separate through, separate right-turn lane to a separate left-turn, one (1) through, and one through-right-turn lane
  - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

The mitigated study intersections lane configurations and intersection control are the same in all three (3) phase analyses of Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project and are shown in Figure 23 (Alternative A) and Figure 25 (Alternative B).

Intersection Level Of Service Analysis (Alternative A)

The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) intersection lane configurations and intersection controls are shown on Figure 23. Using the lane configurations shown on Figure 23 and the volumes shown on Figure 31, the intersections were analyzed for Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (Alternative A) levels of service. Figure 33 and Table 33 show the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) levels of service for the study intersections. The TWSC levels of service shown on Figure 33 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 33 and in Table 33 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 33 and in Table 33. The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) intersection levels of service calculations are included in Appendix Y.



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MITIGATED INTERSECTION LEVEL OF SERVICE (ALTERNATIVE A)

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 33

TABLE 33:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 (ALTERNATIVE A) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive				
• NB Approach	B	14.9	B	10.9
• **SB Approach**	**F**	**255.7**	D	26.8
Bush Street at Semas Avenue				
• NB Approach	C	23.1	C	24.4
• SB Approach	B	11.7	B	10.0
Bush Street at Belle Haven Drive	C	28.8	C	28.7
Bush Street at SR 41 SB Ramps	C	27.7	B	12.2
Bush Street at SR 41 NB Ramps	C	25.8	B	11.9
Bush Street at 19 ½ Avenue	D	31.3	B	13.7

[1] Delay per vehicle *secs = seconds* *SR = State Route* *NB = northbound*
SB = southbound

Intersections that are projected to operate below the adopted level of service standards are shown bolded in Table 33. As shown in Figure 33 and Table 33, the following locations by time period are projected to operate below the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) scenario:

- Bush Street at College Avenue
    - SB Approach – AM peak hour

The remainder of the study intersections and time periods are projected to continue to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) scenario.

Queue Lengths (Alternative A)

Queuing analyses were performed at all study intersections. Table 34 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) 95th percentile queue lengths developed from the level of service analyses.

TABLE 34:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 (ALTERNATIVE A) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

		95th Percentile Queue Length (ft)	
Intersection Approach	Existing (2018) Queue Storage Length (ft)	AM	PM
Bush Street at College Avenue			
• EB Right	80	0	0
• WB Left	394	40	18

TABLE 34:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 (ALTERNATIVE A) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
Bush Street at Belle Haven Drive			
• NB Left	50	18	30
• **SB Left**	**75**	69	**76**
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	70	49
• SB Right	466[3]	27	21
• EB Right	75	0	30
• **WB Left**	**249**	**283**	47
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	162	103
• NB Right	300[3]	22	34
• EB Left	114	69	25
Bush Street at 19 ½ Avenue			
• NB Left	175	170	23
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	215	28
• EB Left	400	75	73
• EB Right	400	123	53
• WB Left	49	5	3
• WB Right	95	38	18

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)

Intersection queue lengths projected to exceed the available and recommended storage lengths are shown bolded in Table 34. As shown in Table 34, the following intersection queue lengths, by time period, are projected to exceed the available and recommended storage lengths in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (Alternative A) scenario:

- Bush Street at Belle Haven Drive
    - SB left – PM peak hour
- Bush Street at SR 41 SB ramps
    - WB left – AM peak hour

The Bush Street at Belle Haven Drive southbound left-turn and the Bush Street at SR 41 SB Ramp westbound left-turn are projected to exceed the available storage lengths. Therefore, it is recommended that these two (2) turn pockets be lengthened to the following lengths:

- Bush Street at Belle Haven Drive
    - SB left – lengthened from 75 feet to 100 feet
- Bush Street at SR 41 SB ramps
    - WB left – lengthened from 249 feet to 300 feet

Otherwise, these two (2) locations 95th percentile queues may exceed the storage pocket lengths and the left-turns would extend into the through lane and potentially block through traffic. The remaining analyzed intersection queue lengths are not projected to exceed the available storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative A) scenario.

Intersection Level Of Service Analysis (Alternative B)

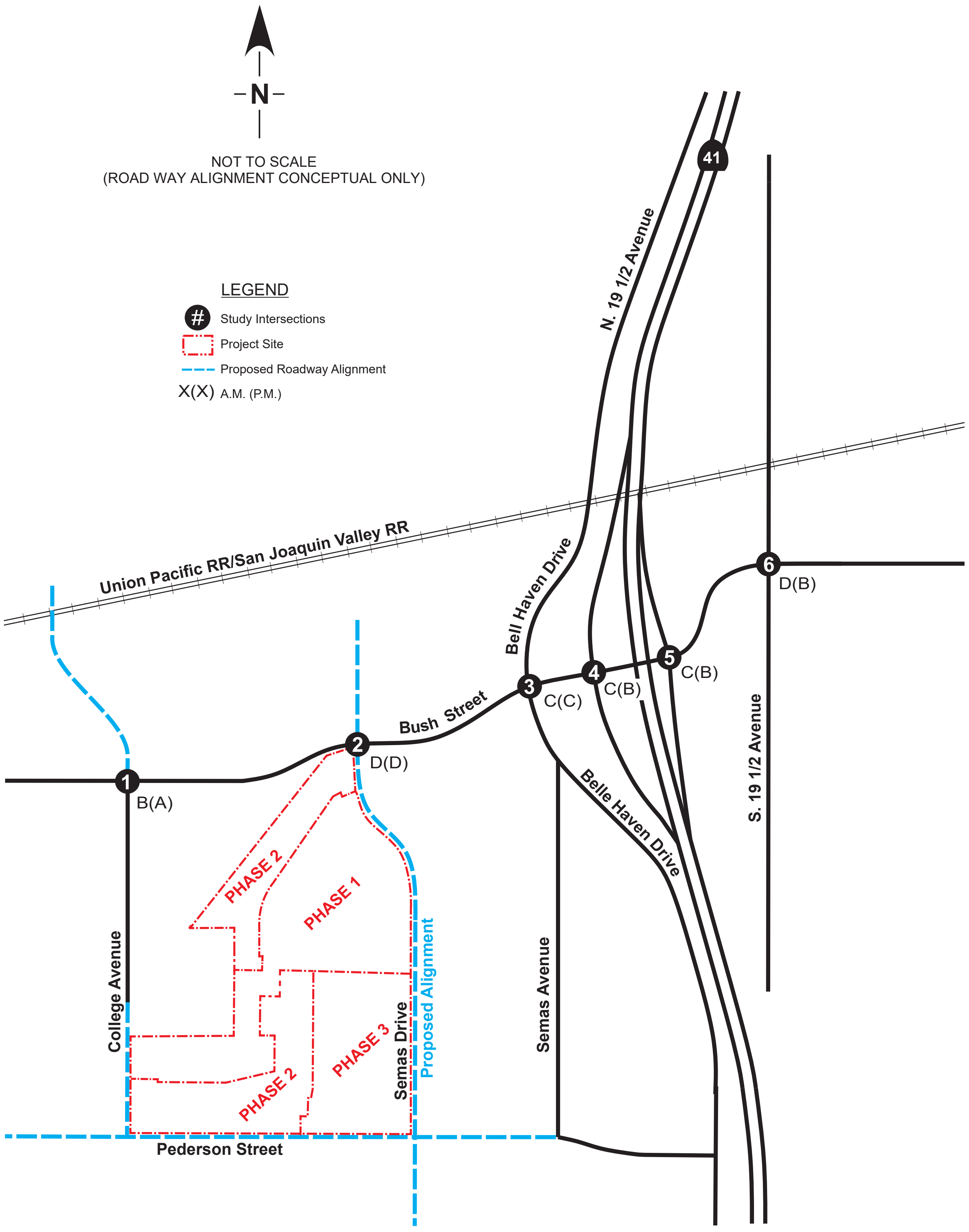
The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) intersection lane configurations and intersection controls are shown on Figure 25. Using the lane configurations shown on Figure 25 and the volumes shown on Figure 31, the intersections were analyzed for Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) levels of service. Figure 34 and Table 35 show the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) levels of service for the study intersections. The TWSC levels of service shown on Figure 34 are the levels of service for the worst approach at that intersection. The AWSC and signalized intersection levels of service shown in Figure 34 and in Table 35 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 34 and in Table 35. The Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) intersection levels of service calculations are included in Appendix Z.

TABLE 35:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 (ALTERNATIVE B) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		PM Peak Hour	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive	B	11.3	A	6.0
Bush Street at Semas Avenue				
• NB Approach	D	31.4	D	25.7
• SB Approach	B	11.6	B	10.0
Bush Street at Belle Haven Drive	C	28.8	C	28.7
Bush Street at SR 41 SB Ramps	C	27.7	B	12.2
Bush Street at SR 41 NB Ramps	C	25.8	B	11.9
Bush Street at 19 ½ Avenue	D	31.3	B	14.3

[1] Delay per vehicle secs = seconds SR = State Route NB = northbound SB = southbound

As shown in Figure 34 and Table 35, with the proposed mitigations all study intersections are projected to operate at or above the appropriate adopted level of service standard in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) scenario.



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MITIGATED INTERSECTION LEVEL OF SERVICE (ALTERNATIVE B)

Existing (2018) + Approved/Pending/Proposed Project
+ Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 34

Queue Lengths (Alternative B)

Table 36 shows the estimated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) 95th percentile queue lengths developed from the level of service analyses.

TABLE 36:
MITIGATED EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 (ALTERNATIVE B) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	na	na
• WB Left	394	na	na
Bush Street at Belle Haven Drive			
• NB Left	50	18	30
• **SB Left**	**75**	69	**76**
• SB Right	75	0	0
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	70	49
• SB Right	466[3]	27	21
• EB Right	75	0	30
• **WB Left**	**249**	**283**	47
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	162	103
• NB Right	300[3]	22	34
• EB Left	114	69	25
Bush Street at 19 ½ Avenue			
• NB Left	175	170	23
• NB Right	50	5	3
• SB Left	106	8	3
• SB Right	354	215	28
• EB Left	400	75	73
• EB Right	400	123	25
• WB Left	49	5	3
• WB Right	95	38	18

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
n/a = does not exist in this scenario

Intersection queue lengths projected to exceed the available and recommended storage lengths are shown bolded in Table 36. As shown in Table 36, the following intersection queue lengths, by time period, are projected to exceed the available and recommended storage lengths in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) scenario:

- Bush Street at Belle Haven Drive
    - SB left – PM peak hour
- Bush Street at SR 41 SB ramps
    - WB left – AM peak hour

The Bush Street at Belle Haven Drive southbound left-turn and the Bush Street at SR 41 SB Ramp westbound left-turn are projected to exceed the available storage lengths. Therefore, it is recommended that these two (2) turn pockets be lengthened to the following lengths:

- Bush Street at Belle Haven Drive
    - SB left – lengthened from 75 feet to 100 feet
- Bush Street at SR 41 SB ramps
    - WB left – lengthened from 249 feet to 300 feet

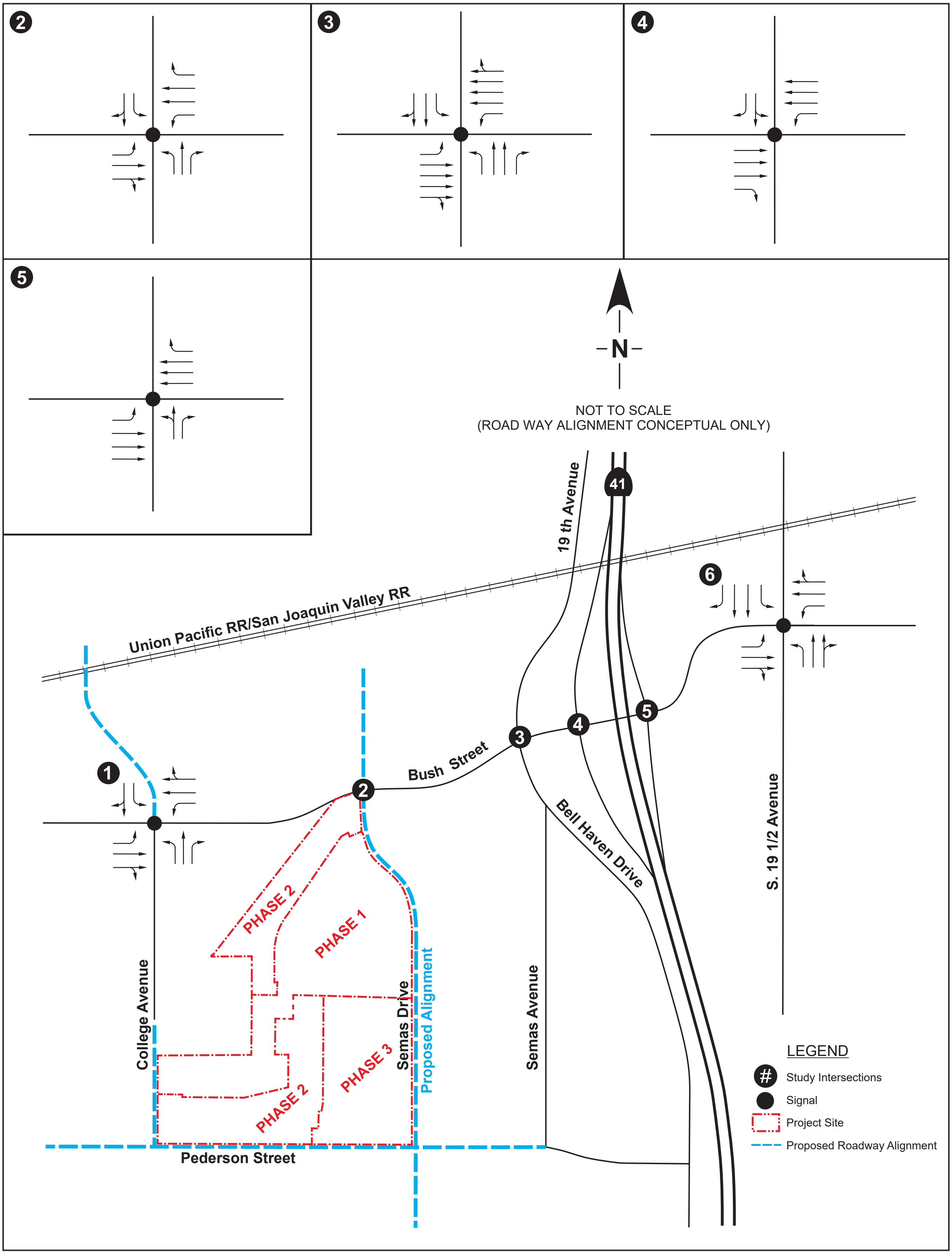
Otherwise, these two (2) locations 95th percentile queues may exceed the storage pocket lengths and the left-turns would extend into the through lane and potentially block through traffic. The remaining analyzed intersection queue lengths are not projected to exceed the available storage lengths in the 95th percentile condition in the Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 (Alternative B) scenario.

2035 PROJECT TRAFFIC CONDITIONS

The City of Lemoore and Caltrans are working together to rebuild the Bush Street at SR 41 interchange. As part of this rebuild, Caltrans prepared a *Project Study Report-Project Development Support (PSR-PDS)* document which was approved in June 2017. Several alternatives were included in this document. The two (2) most likely scenarios to be constructed are the Signal Alternative, which incorporated signalization of the Bush Street at Belle Haven Drive, the Bush Street at SR 41 SB Ramps, and the Bush Street at SR 41 NB Ramps intersections, and the Roundabout Alternative, which incorporates multilane roundabouts at the same three (3) intersections. These two (2) alternatives were evaluated for the 2035 Project scenario along with signalization for the remaining three study intersections as well as the planned Bush Street widening. Signalization for the remaining three (3) intersections and Bush Street widening were assumed based on a review of the City of Lemoore *2030 General Plan* and the *Development Impact Fee Study*.

Intersection Level Of Service Analysis (Signal Alternative)

The 2035 Project (Signal Alternative) intersection lane configurations and intersection controls are shown on Figure 35. The 2035 Project intersection peak hour traffic volumes are shown on Figure 36. Using the lane configurations shown on Figure 35 and the volumes shown on Figure 36, the intersections were analyzed for 2035 Project (Signal Alternative) levels of service. Figure 37 and Table 37 show the 2035 Project (Signal Alternative) levels of service for the study intersections. The signalized intersection levels of service shown in Figure 37 and in Table 37 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the AWSC and signalized level of service or delay shown on Figure 37 and in Table 37. The 2035 Project (Signal Alternative) intersection levels of service calculations are included in Appendix AA.



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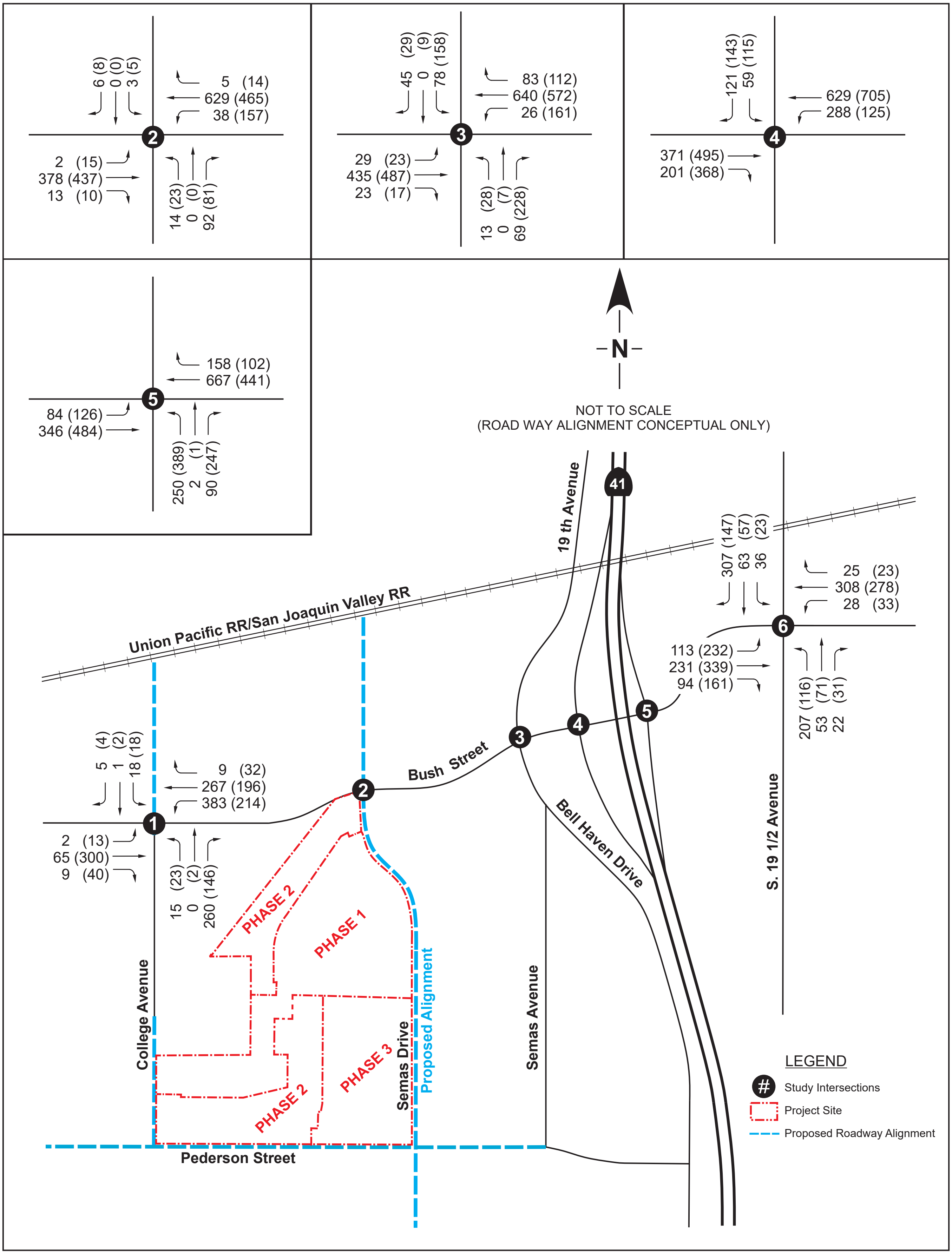
LANE CONFIGURATIONS AND INTERSECTION CONTROL (SIGNAL ALTERNATIVE)

2035 Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 35



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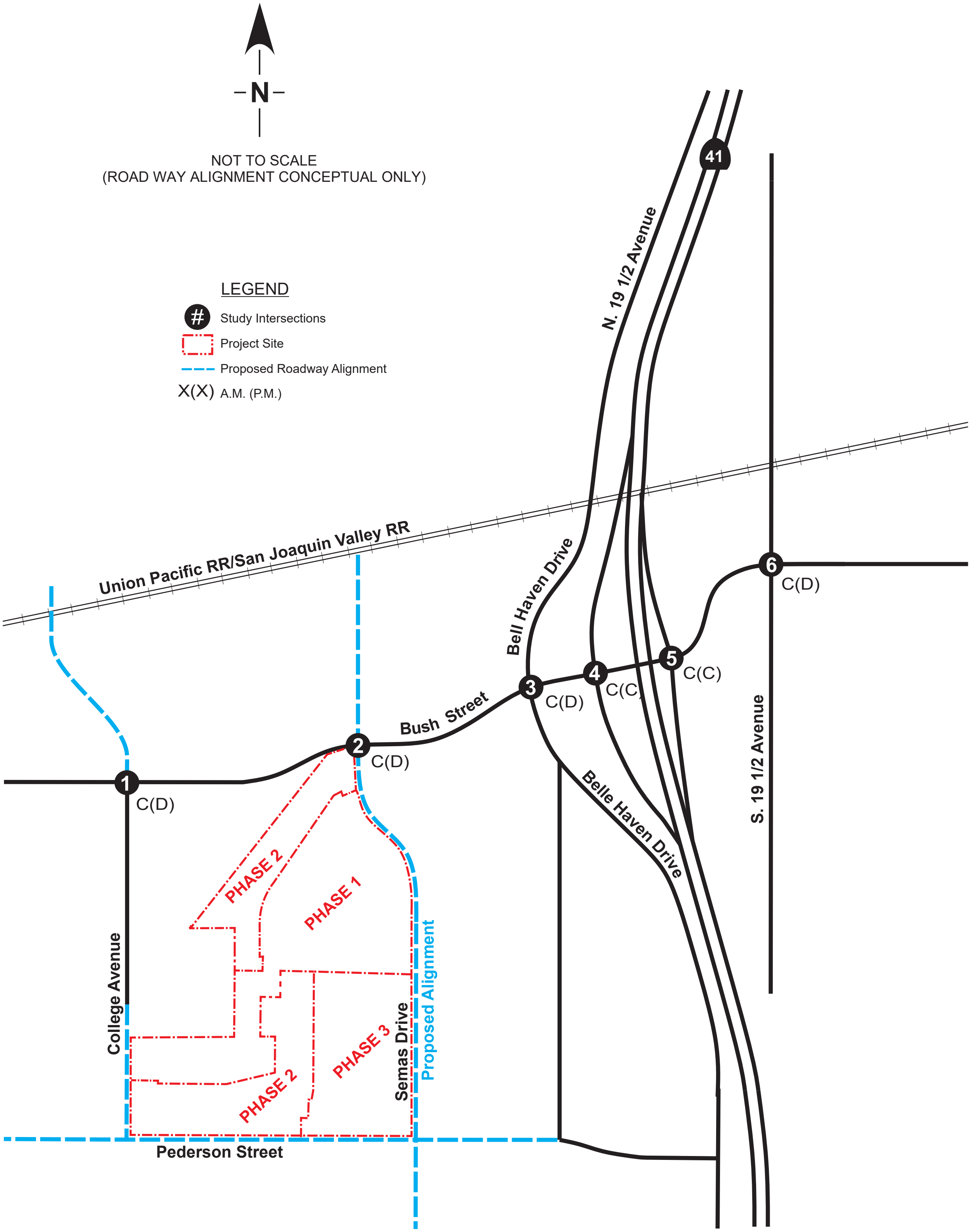
INTERSECTION PEAK HOUR TRAFFIC VOLUMES

2035 Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 36



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INTERSECTION LEVELS OF SERVICE (SIGNALIZED)

2035 Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 37

TABLE 37:
2035 PROJECT (SIGNAL ALTERNATIVE) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive	C	23.5	D	44.3
Bush Street at Semas Avenue	C	20.5	D	44.9
Bush Street at Belle Haven Drive	C	28.6	D	41.9
Bush Street at SR 41 SB Ramps	C	25.5	C	27.2
Bush Street at SR 41 NB Ramps	C	20.7	C	26.4
Bush Street at 19 ½ Avenue	C	32.1	D	43.7

[1] Delay per vehicle *secs = seconds* *SR = State Route* *EB = eastbound*
WB = westbound *NB = northbound* *SB = southbound* *n/a = does not exist in this scenario*

As shown in Figure 37 and Table 37, all of the study intersections are projected to operate at or above the appropriate adopted level of service standard in the 2035 Project (Signal Alternative) scenario.

Queue Lengths (Signal Alternative)

Table 38 shows the estimated 2035 Project (Signal Alternative) 95th percentile queue lengths developed from the level of service analyses.

TABLE 38:
2035 PROJECT (SIGNAL ALTERNATIVE) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	na	na
• WB Left	394	#204	32
Bush Street at Belle Haven Drive			
• NB Left	50	30	52
• **SB Left**	**75**	**111**	**#266**
• SB Right	75	na	na
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	58	94
• SB Right	466[3]	42	38
• **EB Right**	**75**	41	**m263**
• **WB Left**	**249**	**#295**	163
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• **NB Left-Through**	**300[3]**	185	**325**
• NB Right	300[3]	32	48
• EB Left	114	98	170
Bush Street at 19 ½ Avenue			
• **NB Left**	**48**	**#289**	**#161**

TABLE 38:
2035 PROJECT (SIGNAL ALTERNATIVE) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• NB Right	50	na	na
• SB Left	106	55	45
• SB Right	354	62	50
• EB Left	400	#175	#285
• EB Right	50	na	na
• WB Left	49	45	58
• WB Right	95	na	na

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
 # = 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
n/a = does not exist in this scenario

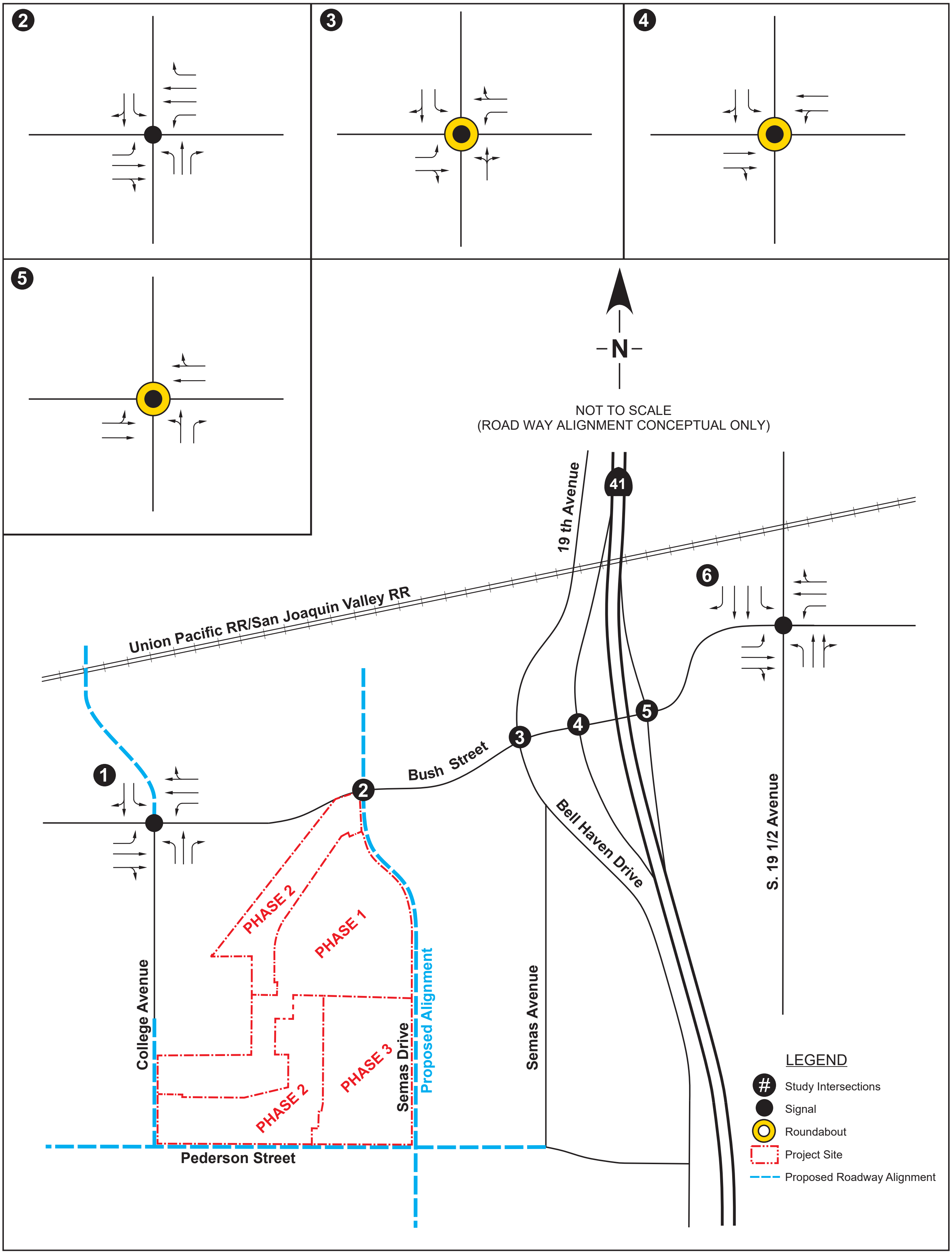
Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 38. As shown in Table 38, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the 2035 Project (Signal Alternative) scenario:

- Bush Street at Belle Haven Drive
  - SB Left – AM/PM peak hours
- Bush Street at SR 41 SB ramps
  - EB Right – PM peak hour
  - WB left – AM peak hour
- Bush Street at SR 41 NB Ramps
  - NB Left-Through – PM peak
- Bush Street at 19 ½ Avenue
  - NB Left – AM/PM peak hours

All four (4) intersections with queue length exceedances will be modified as part of either the Bush Street at SR 41 interchange redesign/reconstruction, the Bush Street widening, or signal installation. These exceedances would be eliminated due to these forecasted improvements. The remaining analyzed intersection queue lengths are not projected to exceed the available storage lengths in the 95th percentile condition in the 2035 Project scenario.

Intersection Level Of Service Analysis (Roundabout Alternative)

The 2035 Project (Roundabout Alternative) intersection lane configurations and intersection controls are shown on Figure 38. Using the lane configurations shown on Figure 38 and the volumes shown on Figure 36, the intersections were analyzed for 2035 Project (Roundabout Alternative) levels of service. Figure 39 and Table 39 show the 2035 Project (Roundabout Alternative) levels of service for the study intersections. The signalized intersection levels of service shown in Figure 39 and in Table 39 are representative of the whole intersection. Individual intersection movements or approaches may operate above or below the signalized level of service or delay shown on Figure 39 and in Table 39. The 2035 Project (Roundabout Alternative) intersection levels of service calculations are included in Appendix AB.



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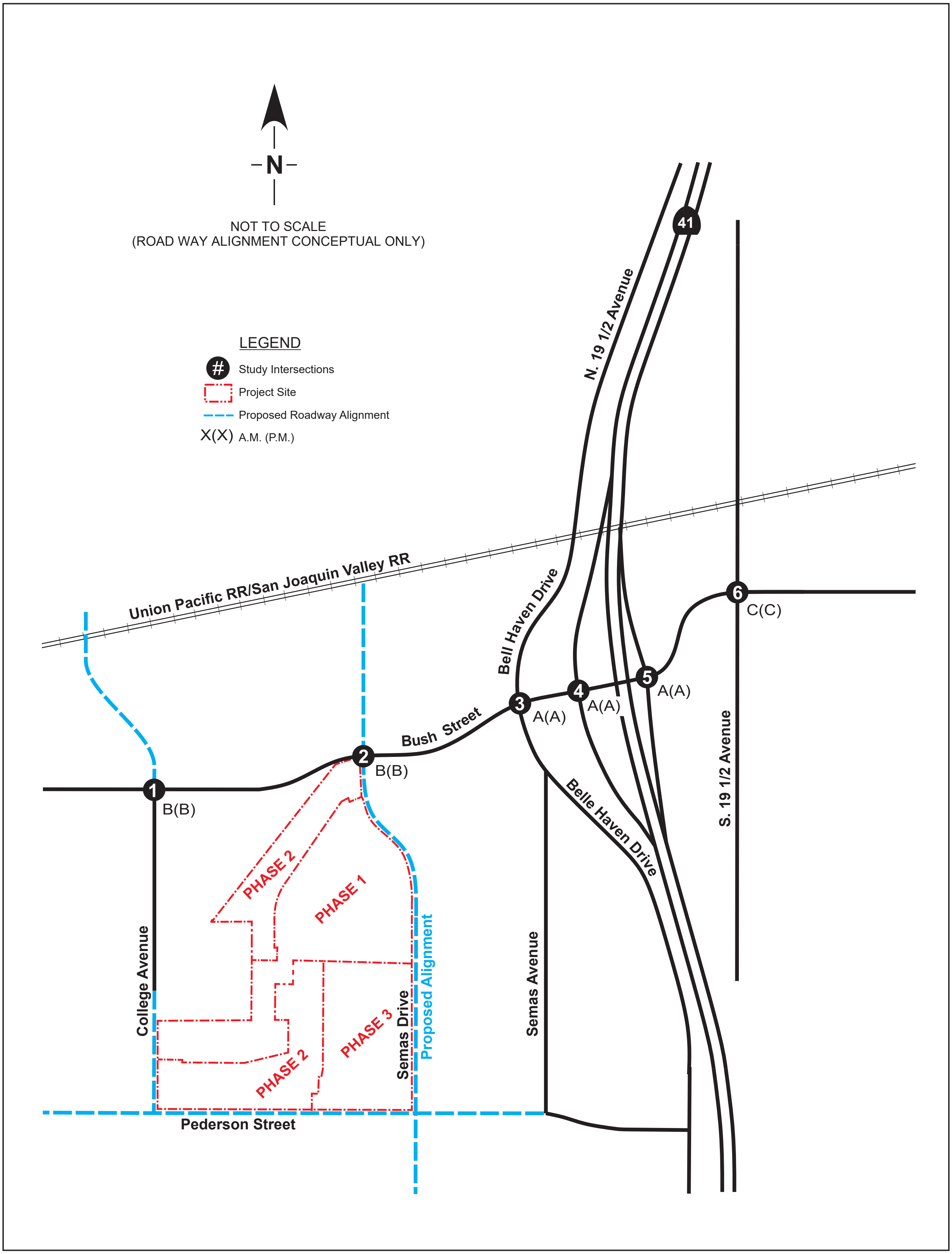
LANE CONFIGURATIONS AND INTERSECTION CONTROL (ROUNDABOUT ALTERNATIVE)

2035 Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 38



ND Engineering, PC

INTERSECTION LEVELS OF SERVICE (ROUNDABOUT ALTERNATIVE)

2035 Project (Phase 1, 2, & 3 - 370 DU)

City of Lemoore, California

Figure 39

TABLE 39:
2035 PROJECT (ROUNDABOUT ALTERNATIVE) TRAFFIC CONDITIONS ANALYSIS
INTERSECTION WEEKDAY PEAK HOUR LEVEL OF SERVICE

	AM Peak Hour		**PM Peak Hour**	
Intersection	**LOS**	**Delay[1] (secs)**	**LOS**	**Delay[1] (secs)**
Bush Street at College Drive	B	17.9	B	16.0
Bush Street at Semas Avenue	B	13.0	B	15.5
Bush Street at Belle Haven Drive	A	8.1	A	9.3
Bush Street at SR 41 SB Ramps	A	6.9	A	7.4
Bush Street at SR 41 NB Ramps	A	7.4	A	9.0
Bush Street at 19 ½ Avenue	C	24.7	C	20.2

[1] Delay per vehicle secs = seconds SR = State Route EB = eastbound
WB = westbound NB = northbound SB = southbound

As shown in Figure 39 and Table 39, all of the study intersections are projected to operate at or above the appropriate adopted level of service standard in the 2035 Project (Roundabout Alternative) scenario.

Queue Lengths (Roundabout Alternative)

Table 40 shows the estimated 2035 Project (Roundabout Alternative) 95th percentile queue lengths developed from the level of service analyses.

TABLE 40:
2035 PROJECT (ROUNDABOUT ALTERNATIVE) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

Intersection Approach	Existing (2018) Queue Storage Length (ft)	95th Percentile Queue Length (ft)	
		AM	PM
Bush Street at College Avenue			
• EB Right	80	na	na
• WB Left	394	#214	97
Bush Street at Belle Haven Drive			
• NB Left	50	na	na
• SB Left	75	na	na
• SB Right	75	na	na
Bush Street at SR 41 SB Ramps	1,315[1](1,045[2])		
• SB Left-Through	466[3]	na	na
• SB Right	466[3]	na	na
• EB Right	75	na	na
• WB Left	249	na	na
Bush Street at SR 41 NB Ramps	1,090[1] (820[2])		
• NB Left-Through	300[3]	na	na
• NB Right	300[3]	na	na
• EB Left	114	na	na
Bush Street at 19 ½ Avenue			

TABLE 40:
2035 PROJECT (ROUNDABOUT ALTERNATIVE) TRAFFIC CONDITIONS ANALYSIS
95TH PERCENTILE QUEUE LENGTHS

	Existing (2018) Queue Storage Length	95th Percentile Queue Length (ft)	
• **NB Left**	**48**	**#289**	**#178**
• NB Right	50	na	na
• SB Left	106	55	40
• SB Right	354	62	44
• EB Left	400	#175	#334
• EB Right	400	na	na
• WB Left	49	45	51
• WB Right	95	na	na

ft = feet NB = northbound SB = southbound WB = westbound EB = eastbound
[1] = Total ramp length [2] = calculated storage distance [3] = Distance of ramp striped as 2-lanes (existing)
n/a = does not exist in this scenario #95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after 2 cycles

Intersection queue lengths projected to exceed the available storage lengths are shown bolded in Table 40. As shown in Table 40, the following intersection queue lengths, by time period, are projected to exceed the available storage lengths in the 2035 Project (Roundabout Alternative) scenario:

- Bush Street at 19 ½ Avenue
    - NB Left – AM/PM peak hours

Again, this intersection will be redesigned as part of the intersection signalization and Bush Street widening. Therefore, the queue length exceedance would be eliminated. The remaining analyzed intersection queue lengths are not projected to exceed the available storage lengths in the 95th percentile condition in the 2035 Project (Roundabout Alternative) scenario.

CONCLUSIONS AND RECOMMENDATIONS

Impacts

Based on the information provided in this report, the following locations, by scenario, are projected to operate below the appropriate adopted level of service (LOS) standard:

Existing (2018) (Without the Project)

- Bush Street at State Route (SR) 41 southbound (SB) ramps
    - SB Approach – AM peak hour

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Project Phases 1 & 2 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at Belle Haven Drive – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM peak hour
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at College Avenue
    - SB Approach – AM peak hour
- Bush Street at Semas Avenue
    - NB Approach – AM peak hour
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at College Avenue
    - NB Approach – AM peak hour
    - SB Approach – AM peak hour

- Bush Street at Semas Avenue
    - NB Approach – AM/PM peak hours
- Bush Street at Belle Haven Avenue – AM peak hour
- Bush Street at SR 41 SB Ramps
    - SB Approach – AM/PM peak hours
- Bush Street at SR 41 NB Ramps
    - NB Approach – AM peak hour
- Bush Street at 19 ½ Avenue – AM peak hour

The following locations by scenario are projected to meet the urban peak hour volume signal warrant:

Existing (2018) Plus Project Phase 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps

The following locations by scenario are projected to have movements with queue lengths that exceed or are projected to exceed their available storage lengths:

Existing (2018) (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Project Phases 1 & 2 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects (Without the Project)

- Bush Street at 19 ½ Avenue
    - NB Left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 (With the Project)

- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 & 2 (With the Project)

- Bush Street at SR 41 NB Ramps
    - NB Left-Through – AM peak hour
- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, & 3 (With the Project)

- Bush Street at SR 41 NB Ramps
    - NB Left-Through – AM peak hour
- Bush Street at 19 ½ Avenue
    - NB left – AM peak hour

Recommendations

Existing (2018) Plus Project Phases 1, 2, & 3 (With the Project)

The majority of the mitigations are the same in all three (3) phases, therefore it is recommended that all mitigations be implemented with completion of Phase 1.

- Bush Street at SR 41 NB Ramps
    - Signalize the intersection

As shown in this document, the urban peak hour volume warrant is not meet at the Bush Street at SR 41 NB Ramps intersection in the Existing (2018) Plus Project Phase 1 scenario. However it should be noted that the Bush Street at SR 41 NB ramp intersection in the Existing (2018) Plus Project Phase 1 scenario, the convergent point where the major street two-directional volume, the minor street highest approach volume, and the number of lanes per approach line is approximately 735 to 736 vehicles per hour major street, and 400 vehicles per hour minor street, which is only six (6) vehicles more than is currently projected for the minor street highest volume in the Existing (2018) Plus Project Phase 1 scenario. These six (6) vehicles would fall within the +/- 10% error range for daily variation in vehicle counts. Therefore, it is recommended that this intersection be signalized in the Existing (2018) Plus Project Phase 1 scenario subject to a complete warrant analysis being prepared at that time.

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two (2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive
    - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
    - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
    - Construct an eastbound 75 feet left-turn pocket

  - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
  - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket

- Bush Street at SR 41 SB Ramps
  - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections

- Bush Street at SR 41 NB Ramps
  - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections

- Bush Street at 19 ½ Avenue
  - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1, 2, & 3 (With the Project)

The majority of the mitigations are the same in all three (3) phases, therefore it is recommended that all mitigations be implemented with completion of Phase 1.

Two (2) alternative set of improvements are recommended in the Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 scenario. The two (2) set of alternatives differ at the Bush Street and College Avenue intersection and the Bush Street at Semas Drive intersection mitigations with the remaining intersection mitigations the same. The two (2) alternatives are referred to as Alternative A and Alternative B and include the following:

- Bush Street at College Avenue (Alternative A)
  - Convert the northbound approach from a shared left-through-right lane to a shared left-through lane and a separate right-turn lane
  - Convert the eastbound approach from a shared left-through and a separate right-turn lane to a shared left-through and a shared through-right lane
  - Convert the westbound approach from a separate left-turn lane and a shared through-right lane to a separate left-turn lane, one (1) through, and a shared through-right lane

- Bush Street at College Avenue (Alternative B)
  - Convert the intersection from a TWSC intersection to a single lane roundabout with shared left-through-right lanes on all approaches

- Bush Street at Semas Drive (Alternative A)
  - Convert the eastbound approach from a shared left-through-right to a separate left-through and a separate through-right lane
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line

- Bush Street at Semas Drive (Alternative B)
  - Convert the westbound approach from shared left-through-right to a separate left-through and a separate through-right line

- Bush Street at SR 41 NB Ramps (Alternative A or B)
  - Signalize the intersection

Per previous discussions with Caltrans, if one ramp end intersection warrants a signal, Caltrans will typically signalize all intersections within an interchange area. Since the Bush Street at Belle Haven Drive intersection is within close proximity to the SR 41 SB Ramps, less than 400 feet distance between the two

(2) intersections, and therefore within the traffic influence of the ramps, the Bush Street at Belle Haven Drive intersection is typically considered part of the Bush Street at SR 41 interchange area. Therefore, the following additional improvements are recommended:

- Bush Street at Belle Haven Drive (Alternative A or B)
  - Signalize the intersection and coordinate/optimize with the Bush Street at SR 41 SB Ramps and the SR 41 NB Ramps intersection
  - Lengthen the southbound left-turn pocket from 75 feet to 100 feet
  - Convert the eastbound approach from a shared left-through-right line to a separate left-turn lane and a shared through-right lane
  - Construct an eastbound 75 feet left-turn pocket
  - Convert the westbound approach from a shared left-through, a shared through-right, and a separate right-turn to a separate left-turn, two (2) through lanes and a separate right-turn lane
  - Construct a westbound 75 feet left-turn pocket and a 75 feet right-turn pocket
- Bush Street at SR 41 SB Ramps (Alternative A or B)
  - Signalize the intersection and coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 NB Ramps intersections
  - Lengthen the westbound left-turn pocket from 249 feet to 300 feet
- Bush Street at SR 41 NB Ramps (Alternative A or B)
  - Coordinate/optimize with the Bush Street at Belle Haven Drive and the Bush Street at SR 41 SB Ramps intersections
- Bush Street at 19 ½ Avenue (Alternative A or B)
  - Convert the westbound separate left-turn, separate through, separate right-turn lane to a separate left-turn, one (1) through, and one through-right-turn lane
  - Lengthen the northbound left-turn pocket from 48 feet to 175 feet

Impact Fees/Proportionate Share Percentages

Assuming the site develops consistent with this TIS, the Project would pay the following Streets and Thoroughfares Impact Fee per phase:

Phase 1
155 DUs X $4,897/DU (fee rate per latest City of Lemoore fee schedule) = $759,035.00

Phase 1 & 2
264 DUs X $4,897/DU (fee rate per latest City of Lemoore fee schedule) = $1,292,808.00

Phase 1, 2, & 3
370 DUs X $4,897/DU (fee rate per latest City of Lemoore fee schedule) = $1,811,890.00

This Streets and Thoroughfares Impact Fee would at a minimum include the following items:

- Bush Street at SR 41 Interchange Redesign/Construction – includes the intersections of Belle Haven Drive, SR 41 SB Ramps, and SR 41 NB Ramps
- Signalization of Bush at College and Bush at 19 ½ Avenue

In addition, the Streets and Thoroughfares Impact Fee may include the following items:

- Widening of Bush Street from Marsh Drive to 19 ½ Avenue
- Construction/Widening of College Avenue from Pederson Street to Bush Street

- Construction of Pederson Street from Marsh Drive to Semas
- Construction of Semas Avenue from Pederson Street to Bush Street

Therefore, any improvements that the Project makes to any of these facilities should be credited towards their impact fees.

City of Lemoore Proportionate Share Percentage for any improvements not included in the impact fees were calculated by taking the Project trips and dividing by the total projected Future year background plus Project volumes for the given study location. The formula used in calculating the City of Lemoore Proportionate Share Percentages is:

Proportionate Share Percentage = Project only trips/(Future year background + Project Volume)

The proportionate share percentages are:

Phase 1

- Bush Street at College Avenue – 4.14%
- Bush Street at Semas Drive – 11.24%
- Bush Street at 19 ½ Avenue – 3.18%

Phase 2

- Bush Street at College Avenue – 6.99%
- Bush Street at Semas Drive – 19.10%
- Bush Street at 19 ½ Avenue – 5.37%

Phase 3

- Bush Street at College Avenue – 9.64%
- Bush Street at Semas Drive – 26.47%
- Bush Street at 19 ½ Avenue – 7.43%

APPENDIX A

METHODOLOGY

METHODOLOGY

This TIS was prepared to assess the traffic impacts due to development of approximately 62 acres of vacant land consisting of the following uses:

- 370 single family dwelling units, located on the northeast corner of the new alignment of Semas Avenue and Pederson Street south of the trail and gas pipeline easement
- Mixed use development consisting of 200 multi-family dwelling units and 20,000 square feet (sf) of retail shopping center, located on the southeast corner of College Avenue and Bush Street north of the trail and gas pipeline easement

The Lennar Lemoore Project is located within the Lemoore, California city limits. For purposes of this study, the single family dwelling units are considered the Project and the mixed use component is shown as a proposed project in the Existing Plus Approved/Pending/Proposed and the Existing Plus Approved/Pending/Proposed Plus Project scenarios. As part of this Project, the following roadways will be constructed:

- Semas Drive – new alignment, located to the east of the Project; also known as Semas Avenue
- Pederson Street – located to the south of the Project; also known as Pederson Avenue or Pedersen Avenue or Pedersen Street
- College Avenue – extension from current terminus to Pederson Street; also known as College Drive

Figure 1 shows the Project location and Figure 2 shows the Project site plan.

In order to prepare the traffic evaluation for the Project, a variety of data and technical assumptions had to be developed. This section of the report describes the various sources, data and technical assumptions used in this evaluation.

Sources

This report was prepared using information taken from the following sources:

- *California Manual on Uniform Traffic Control Devices (CA MUTCD) for Streets and Highways*, California Department of Transportation, Division of Traffic Operations, March 9, 2018.
- *City of Lemoore 2030 General Plan*, City of Lemoore Planning & Development Department, May 2008.
- David Padilla, Associate Transportation Planner, Office of Planning & Local Assistance, Caltrans, Phone/email discussions, 2018.
- *General Plan Amendment No. 2018-01*, Staff Report, April 2018.
- *Guide for the Preparation of Traffic Impact Studies*, Caltrans, December 2002.
- *Granville Homes – Multi-family Project*, Initial Study and Mitigated Negative Declaration, QK Inc., August 2017.
- *Highway Capacity Manual, 6th Edition*, Transportation Research Board, 2016.
- Joel Joyner, PE, PLS, Senior Engineer, QK Incorporated, Email discussions, 2018.
- *Kings County Regional Active Transportation Plan*, Eisen/Letunic, January 2019.
- *Kings County Travel Demand Model*, Kings County Association of Governments, 2018.
- Kristie Baley, Planning Technician, Community Development Department, City of Lemoore, Phone/email discussions, 2018 - 2019.
- Miao Gao, EIT, Engineering Associate, Kittelson & Associates, Inc., Phone/email discussions, 2018/2019.

- Mike Aronson, PE, Principal Engineer, Kittelson & Associates, Inc., Phone/email discussions, 2018/2019.
- *Project Study Report – Project Development Support (PSR-PDS)* for SR 41 at Bush Street Interchange, May 2017.
- *Resolution #2011-48* (Victory Village), City of Lemoore, December 20,2011.
- *Resolution #2017-15* (Development Impact Fees), City of Lemoore, August 19, 2017.
- *Synchro 10.0*, Trafficware, 2017.
- *Trip Generation*, 10th Edition, Volume 2, ITE, 2017.
- *Trip Generation,* https://itetripgen.org, 2017.

Scenarios

The scenarios that were analyzed for this study included:

- Existing (2018) Traffic Conditions (Without the Project)
- Existing (2018) Plus Project Phase 1 Traffic Conditions (With the Project)
- Existing (2018) Plus Project Phases 1 and 2 Traffic Conditions (With the Project)
- Existing (2018) Plus Project Phases 1, 2, and 3 Traffic Conditions (With the Project)
- Mitigated Existing (2018) Plus Project Phase 1 Traffic Conditions (With the Project)
- Mitigated Existing (2018) Plus Project Phases 1 and 2 Traffic Conditions (With the Project)
- Mitigated Existing (2018) Plus Project Phases 1, 2, and 3 Traffic Conditions (With the Project)
- Existing (2018) Plus Approved/Pending/Proposed Projects Traffic Conditions (Without the Project)
- Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 Traffic Conditions (With the Project)
- Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 Traffic Conditions (With the Project)
- Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 Traffic Conditions (With the Project)
- Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phase 1 Traffic Conditions (With the Project)
- Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1 and 2 Traffic Conditions (With the Project)
- Mitigated Existing (2018) Plus Approved/Pending/Proposed Projects Plus Project Phases 1, 2, and 3 Traffic Conditions (With the Project)
- 2035 Project Phases 1, 2, and 3 Traffic Conditions (With the Project)

The Existing (2018) Plus Approved/Pending/Proposed Project Plus Project/2035 Project scenarios reflect cumulative conditions analysis as required by CEQA.

Study Locations

The study locations evaluated for this Project are as follows:

- Bush Street at College Avenue
- Bush Street at Semas Avenue – Project Only
- Bush Street at Belle Haven Drive
- Bush Street at SR 41 SB Ramps
- Bush Street at SR 41 NB Ramps
- Bush Street at 19 ½ Avenue

Figure 1 shows the intersection analysis locations.

Analysis Time Periods

According to *Transportation Impact Analyses for Site Development*, the overall purpose of a traffic impact study is to determine the project impacts that are likely to occur to the surrounding street system. In order to accomplish this purpose, you need to determine what occurs when the peak of the project generated traffic overlays the peak of the street traffic. *Transportation Impact Analyses for Site Development* states "the peak periods [of the adjacent street and highway system] are generally the weekday morning (7-9 a.m.) and evening (4-6 p.m.) peak hours, although local area characteristics occasionally result in other peaks (e.g., at major shopping or recreational centers)". The peak hours analyzed in this study were:

- 7:00 to 9:00 AM
- 4:00 to 6:00 PM

These are the standard peak hours of the street typically used for study in the City of Lemoore as stated in the Caltrans *Guide for the Preparation of Traffic Impact Studies*, December 2002.

Traffic Counts

According to the Caltrans *Guide for the Preparation of Traffic Impact Studies*, one of the common rules for counting vehicular traffic is:

> "Vehicle counts should be conducted on Tuesdays, Wednesdays, or Thursdays during weeks not containing a holiday and conducted in favorable weather conditions."

Table A-1 shows the dates and days the intersection counts were taken.

**TABLE A-1:
EXISTING INTERSECTION COUNTS
DATES AND DAYS COUNTED**

	AM Peak Hour		PM Peak Hour	
Intersections	**Day**	**Date**	**Day**	**Date**
Bush Street at College Avenue	Wednesday	8/29/18	Wednesday	8/29/18
Bush Street at Belle Haven Drive	Wednesday	8/29/18	Wednesday	8/29/18
Bush Street at SR 41 SB Ramps	Wednesday	8/29/18	Wednesday	8/29/18
Bush Street at SR 41 NB Ramps	Wednesday	8/29/18	Wednesday	8/29/18
Bush Street at 19 ½ Avenue	Wednesday	8/29/18	Wednesday	8/29/18

As shown in Table A-1 all intersection counts were conducted on days that were appropriate to count. Copies of the intersection count data are included in Appendix A-1.

Kings County Traffic Model

Background

Kings County Association of Governments (KCAG) is a State Regional Transportation Planning Agency for Kings County. As a transportation planning agency, KCAG is responsible for developing and maintaining a microcomputer-based traffic simulation model that represents Kings County.

The current Model was developed to analyze proposed land uses, circulation systems, and air quality. This Model covers the entire Kings County area, and meets or exceeds all State and Federal modeling requirements and is constantly being updated to insure incorporation of the latest planning assumptions.

Model Land Use

Per discussions with Kittelson Associates, the KCAG model did not include the Approved/Pending/Proposed projects, so the trips from the Approved/Proposed/Pending projects were added after the 2035 base volumes were developed from the model data. Kittelson Associates also stated the following:

"The General Plan zoning map for each community was used to calculate the traffic analysis zone development capacities. However, in order to fit with the overall county population forecast, by 2040 they could only include 29% residential development capacity and 5% retail employment capacity. They applied these percentages throughout the urbanized areas, so they did not prioritize full development in one part of Lemoore over potential development in other parts of Lemoore or Hanford."

Project Model Use

The Model was used in this study to develop the following pieces of information:

- Project primary (new) trip distributions
- 2018/2035 No Project/"0" Project background growth increments

The 2018 and 2035 model years were used to create the 2035 No Project/"0" Project background growth increments for the study area roadways. Appendix A-2 contains a copy of the model data used in this TIS.

Project Trip Generation

The Project trip generation information was developed from the information provided by the applicant using the Institute of Transportation Engineers (ITE) *Trip Generation* manual and the corresponding software[1]. Table A-2 lists the corresponding land use codes and page numbers as provided for in the *Trip Generation* manual that were looked at in developing the Project trip generation information for the Project.

TABLE A-2:
ITE TRIP GENERATION DATA
MANUAL REFERENCE INFORMATION

Land Use	Land Use Code	Page Number
Single Family Detached Housing	210	1-28
Multi-family Housing (Low Rise)	220	29-70
Shopping Center	820	137-161

Table A-3 lists the daily, AM peak of the street, and PM peak of the street average rates and the directional distribution used in the Project assessment. Project trips were actually calculated using the *Trip Generation* software and therefore there may be some rounding differences in the data used in the analysis and data prepared using the rates shown in Table A-3. It should be noted that the trip generation information prepared from either the use of the manual or the software is raw data to be used as a basis for further evaluation by the traffic impact study preparer.

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[1] *Trip Generation,* https://itetripgen.org, 2017.

TABLE A-3:
ITE TRIP GENERATION DATA
AVERAGE RATE AND DIRECTIONAL DISTRIBUTION DATA

Land Use (independent variable)	**Period**	**Average Rate**	**Directional Distribution (%)**	
			Enter	**Exit**
Single Family – Detached (DUs)	Daily	9.44	50	50
	AM Peak of Street	0.74	25	75
	PM Peak of Street	0.99	63	37
Multi-family – Attached (DUs)	Daily	7.32	50	50
	AM Peak of Street	0.46	23	37
	PM Peak of Street	0.56	63	37
Shopping Center – 1,000 sf GLA	Daily	37.75	50	50
	AM Peak of Street	0.94	62	38
	PM Peak of Street	3.81	48	52

DUs = dwelling units *sf = square feet* *GLA = gross leasable area*

The rates shown in Table A-3 are based on the various independent trip generation variables shown next to the use.

Table A-4 shows the projected number of daily, AM and PM peak hour trips that are generated by the Project based on the average rate and distributional data shown in Table A-3.

TABLE A-4:
PROJECT TRIP GENERATION DATA

Uses (Independent Variable)	**Size**	**Daily (trips)**	**AM**		**PM**	
			Enter (trips)	**Exit (trips)**	**Enter (trips)**	**Exit (trips)**
Project						
Single Family – Detached (DUs) – Phase 1	155	1,464	29	86	97	57
Single Family – Detached (DUs) – Phase 1 & 2	264	2,493	49	147	165	97
Single Family – Detached (DUs) – Phase 1, 2, & 3	370	3,493	68	206	231	136
Approved/Pending/Proposed						
Multi-family – Attached (DUs)	200	1,318	19	72	73	39
Shopping Center – 1,000 sf GLA	20	854	10	6	29	31
Total Mixed Use		2,172	29	78	102	70

sf = square feet

Project Trip Distribution

Trip distribution for the Project primary (new) trips was based on Model generated trip distribution data. Basically, the Model determines the locations of residents/employees/consumers that are likely to access the Project uses. The Model then estimates the roadways that these residents/employees/consumers would likely use to travel to/from the site, and calculates the number of Model generated vehicle trips projected to occur on each roadway. This roadway trip data is then converted to match the ITE based trip generation data developed for the Project. Per *Transportation Impact Analyses for Site Development*, use of a Model is one of the most commonly accepted methods for estimating trip distribution.[2] As stated previously, the Project primary (new) trip distribution data was prepared using the Model. Figure A1 shows the Project primary (new) intersection assignments for Phase 1. Figure A2 shows the Project primary (new) intersection assignments for Phases 1 and 2. Figure A3 shows the Project primary (new) intersection assignments for Phases 1, 2, and 3.

Future Traffic Volumes

The 2035 No Project/"0" Project forecasted volumes were calculated using growth increment data developed from the 2018 and 2035 No Project/"0" Project Model runs. For those intersections that are showing negative or no growth, a 1.0% per year growth rate applied to the Existing count data was used to calculate future No/"0" Project volumes and should be considered a worst-case.

Approved/Pending/Proposed Land Use Projects

Three (3) approved/pending/proposed land use projects were identified by City staff and included in the Approved/Pending/Proposed and 2035 analyses. These three (3) projects include:

- Granville Homes – 141 multi-family dwelling units located north of Bush Street between College Avenue and Semas Drive – currently vacant
- Victory Village – 51 dwelling units, located north of Bush Street west of College Avenue – currently vacant
- Lennar Mixed Use –200 multi-family dwelling units and 20,000 square feet (sf) of retail shopping center, located on the southeast corner of College Avenue and Bush Street north of the trail and gas pipeline easement – currently vacant

Figure 1 shows the location of these three (3) approved/pending/proposed projects. Figure A4 shows the Approved/Pending/Proposed project trips used in this study.

Intersection Analysis and Volume Adjustments

Heavy vehicle percentages were developed from the existing conditions count data at the majority of the study intersection approach locations. Heavy vehicle percentages used in the analysis were the greater of either the counted or the *HCM 6th edition* 2% default. These percentages were used in all scenarios. Existing peak hour factors taken from the existing count data were used in the existing and near-term analyses. A peak hour factor of 0.92 as provided in the *HCM 6th edition* was used in all intersection analyses for the 2035 scenarios.

For the non-existent streets, College Avenue north of Bush Street, and Semas Drive north and south of Bush Street, the peak hour factors were created using adjacent intersection data. For the north leg of College Avenue, the overall intersection peak hour factor for the Bush Street at College Avenue intersection was used. For the east leg westbound approach of the Bush Street at Semas Drive intersection, the Bush Street at College Avenue east leg westbound approach peak hour factor was used. For the west leg eastbound approach of the Bush Street at Semas Drive intersection, the Bush Street at Belle Haven Drive west leg eastbound approach peak hour factor was used. For the north and south legs of Semas Avenue, the average of the east and west legs was used.

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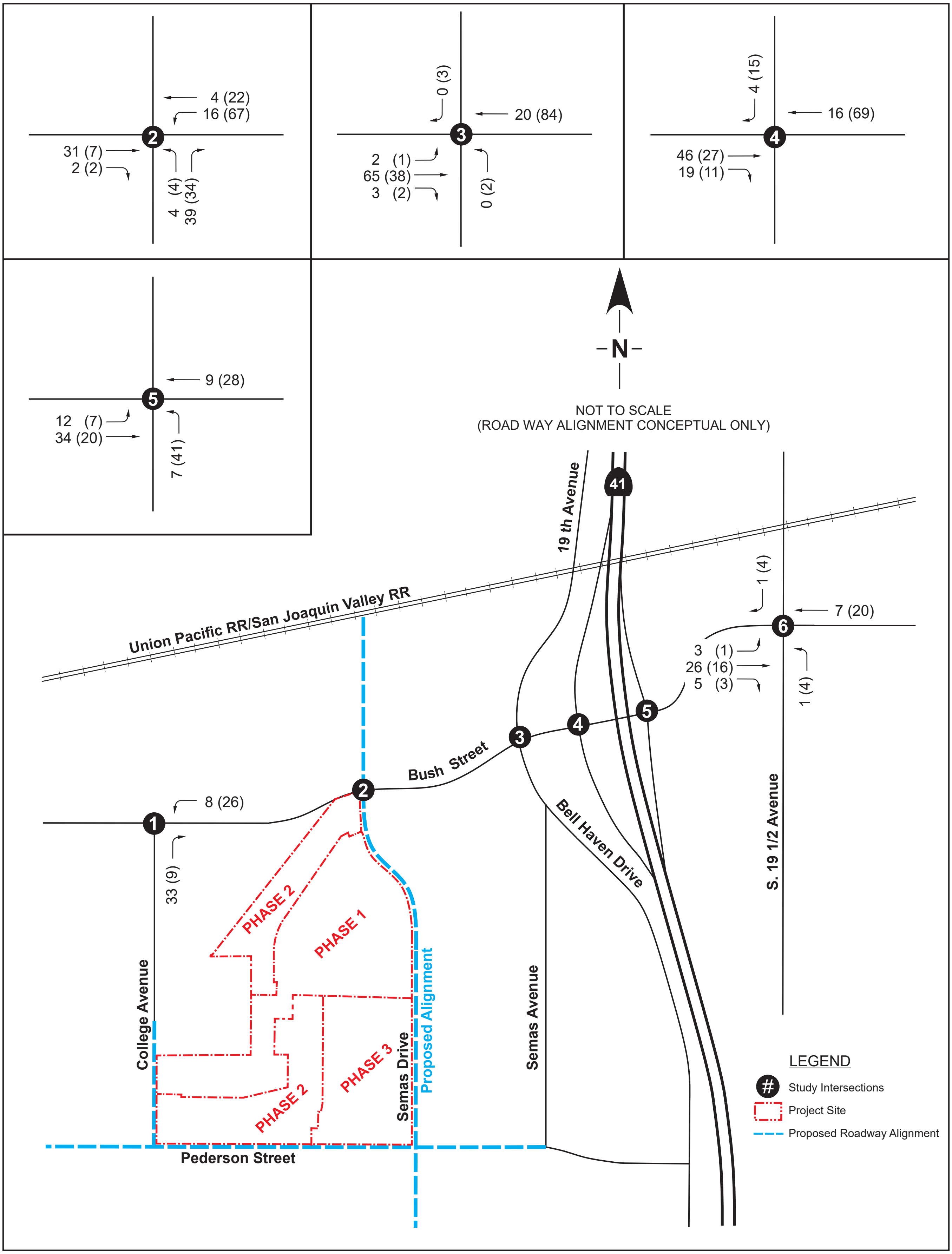
[2] *Traffic Access and Impact Studies for Site Development*, A Recommended Practice, ITE, Transportation Planners Council Task Force on Traffic Access/Impact Studies, 1991, page 27.



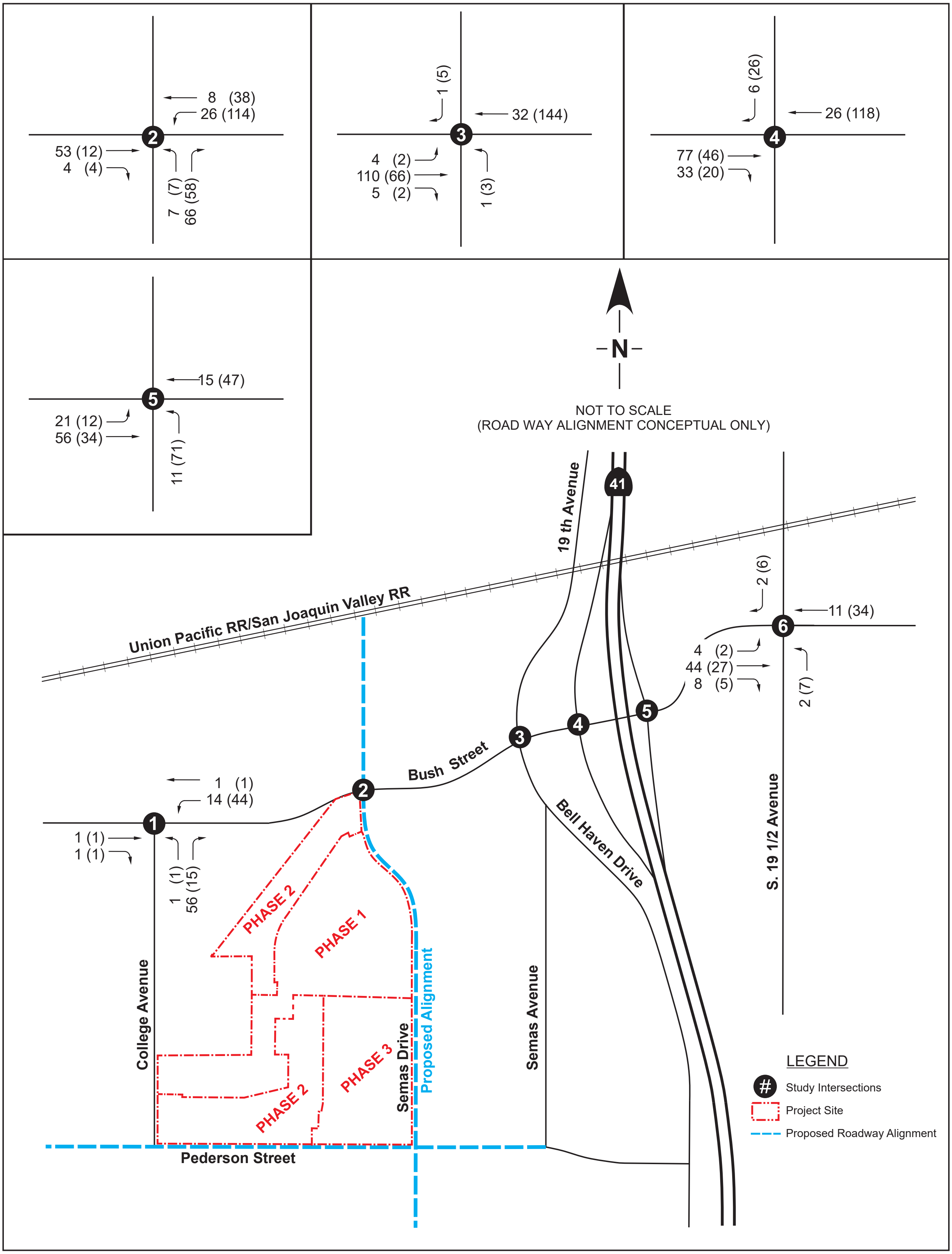
ND Engineering, PC

INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Project Trips (Phase 1 - 155 DU)

City of Lemoore, California

Figure A1



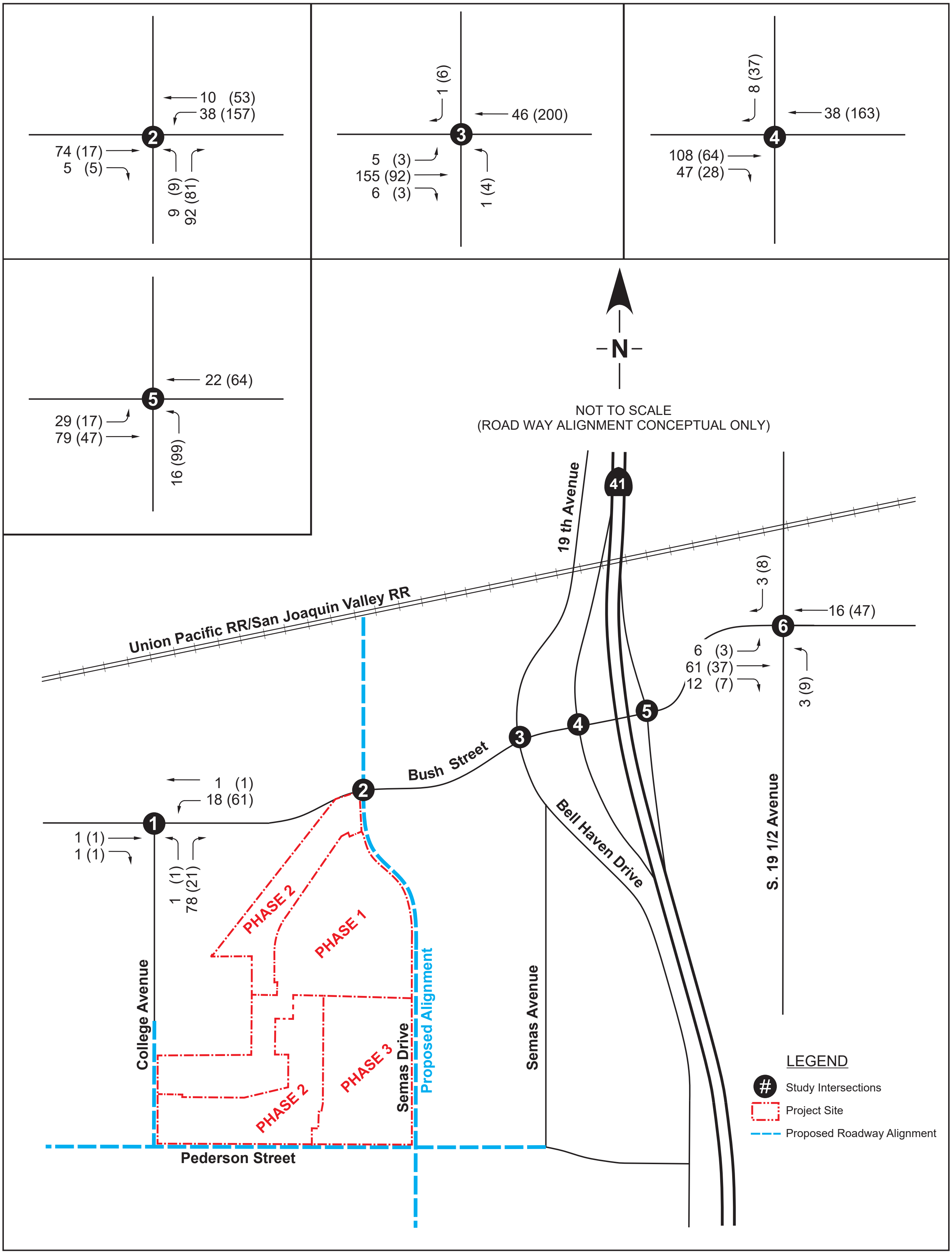
ND Engineering, PC

INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Project Trips (Phase 1 & 2 - 264 DU)

City of Lemoore, California

Figure A2



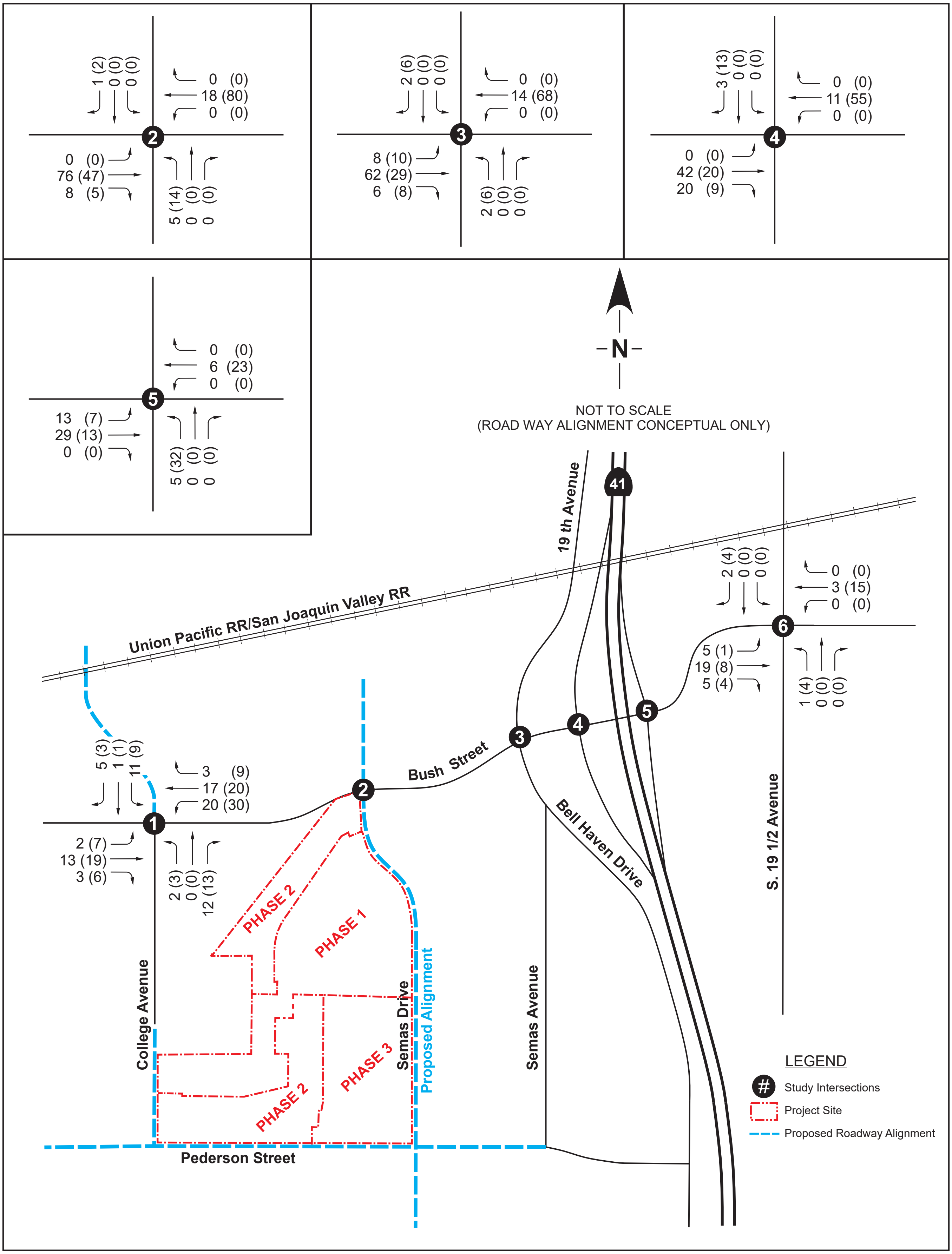
ND Engineering, PC

INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Project Trips (Phase 1,2, & 3 - 370 DU)

City of Lemoore, California

Figure A3



ND Engineering, PC

INTERSECTION PEAK HOUR TRAFFIC VOLUMES

Approved/Pending/Proposed Projects

City of Lemoore, California

Figure A4

Signal timing for all future optimized scenarios were optimized. A default of 10 pedestrian calls per hour was used at all signalized intersections.

The signalized study intersections were analyzed as actuated coordinated in all scenarios as appropriate. Actuated signals use vehicle detectors and an actuated controller unit to assign the right of way based on changing traffic demand. Coordinated signals use system phasing and offsets to provide smooth progression of traffic flow along a corridor.

Left-turns at future signalized intersections were analyzed as "protected". Permitted/unprotected lefts are left-turns that are allowed to go at the same time as the opposing direction through and right-turn movements while protected lefts are left-turns that are only allowed to go during their "protected" phase of the signal, and the left-turns are not allowed to go at the same time as the opposing direction through and right-turn movements.

Signal Warrant Analysis

Urban peak hour (Warrant 3) were prepared for all unsignalized intersections, as appropriate, based on the methodology presented in the *California Manual on Uniform Traffic Control Devices (CA MUTCD) for Streets and Highways*, section 4C.04, pages 830, 831, and 837. According to the MUTCD, "the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal." Therefore prior to making a final determination on installation of a proposed signal, a thorough engineering investigation, including collision history, should be conducted.

Queuing Analysis

Queuing analysis was completed using *Synchro*. *Synchro* printouts provide the 95th percentile maximum queue lengths in vehicles for unsignalized intersections and in feet for signalized. The queue lengths for unsignalized intersections were then converted from vehicles to feet. According to the *Synchro* manual, "the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes." The queue lengths shown on the printouts are the queues for each lane movement.

Level of Service Analysis Methods

Unsignalized and signalized intersection analyses were completed using *Synchro*, which incorporates the *HCM 6th edition* methodologies. *Synchro* allows for optimization of signals to provide for the greatest reduction in overall intersection delay. This optimization process can result in different signal cycle lengths for both the AM and PM peak hours of a given scenario and across all scenarios. The changing of the signal cycle length somewhat reflects the agency process whereby the agency will adjust intersection signal cycle lengths for differing traffic conditions based on current count data.

Level of Service

For analysis purposes, the *HCM 6th edition* defines six levels of service for various facility types. The six levels are given letter designations ranging from "A" to "F", with "A" representing the best operating conditions and "F" the worst. Quantifiable measures of effectiveness that best describe the quality of operation on the subject facility type are used to determine the facilities level of service. For signalized and unsignalized intersections, the quantifiable measure of effectiveness is average control delay.[3]

---

[3] Control delay, according to the *Highway Capacity Manual 6th edition*, includes initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Intersections

For signalized and AWSC intersections, "the average control delay per vehicle is estimated for each lane group and aggregated for each approach and for the intersections as a whole". Level of service for the signalized and AWSC intersection is then based on the aggregated intersection delay. Control delay for two-way stop-controlled (TWSC) intersections, which have stop signs on only the minor street approaches, is also per vehicle but is computed for the stop-controlled or minor street movements only since theoretically the through movements on the major street are not experiencing any delay. Since there is no aggregation of delay for a TWSC intersection, there is no intersection level of service as a whole, only levels of service for the individual minor movements. The minor movements generally consist of separate lefts on the major street approaches and all movements on both minor street approaches.

Table A-5 shows the six levels of service and their corresponding ranges of average control delay for both signalized and unsignalized intersections. Table A-5 also contains a brief traffic flow description for signalized intersections for each level of service category. The level of service diagrams provided throughout the report show the levels of service for the study intersections. The levels of service shown for signalized and AWSC intersections are representative of the overall level of service for that intersection. For TWSC intersections, the level of service shown on the maps is the level of service for the worst operating movement at that intersection as opposed to the overall intersection level of service.

TABLE A-5: INTERSECTION LEVEL OF SERVICE DESCRIPTION			**Intersections**	
			Signalized	**Unsignalized[1]**
Level of Service	**Conditions**	**Signalized Intersection Description**	**Delay (secs/veh)**	**Delay (secs/veh)**
"A"	Free Flow	*Users experience very low delay. Progression is favorable and most vehicles do not stop at all.*	≤ 10.0	≤ 10.0
"B"	Stable Operations	*Vehicles travel with good progression. Some vehicles stop, causing slight delay.*	> 10.0 to 20.0	> 10.0 to 15.0
"C"	Stable Operations	*Higher delays result from fair progression. A significant number of vehicles stop, although many continue to pass through the intersection without stopping.*	> 20.0 to 35.0	> 15.0 to 25.0
"D"	Approaching Unstable	*Congestion is noticeable. Progression is unfavorable, with more vehicles stopping rather than passing through the intersection.*	> 35.0 to 55.0	> 25.0 to 35.0
"E"	Unstable Operations	*Traffic volumes are at capacity. Users experience poor progression and long delays.*	> 55.0 to 80.0	> 35.0 to 50.0
"F"	Forced Flow	*Intersection's capacity is oversaturated, causing poor progression and unusually long delays.*	> 80.0	> 50.0

Source: Highway Capacity Manual 6th edition, Transportation Research Board.

[1] Unsignalized intersections include TWSC and AWSC

Level of Service Standards

The City of Lemoore does not have an adopted level of service standard, however per the General Plan most traffic studies are using a LOS "D" as their standard for traffic impact study purposes.

"Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing measures of effectiveness should be maintained."

APPENDIX A-1

TRAFFIC COUNTS

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

ND Engineering
6807 Leameadow
Dallas, TX 75248

LOCATION Bush St @ College Ave

LATITUDE 36.2945

COUNTY Kings

LONGITUDE -119.8216

COLLECTION DATE Wednesday, August 29, 2018

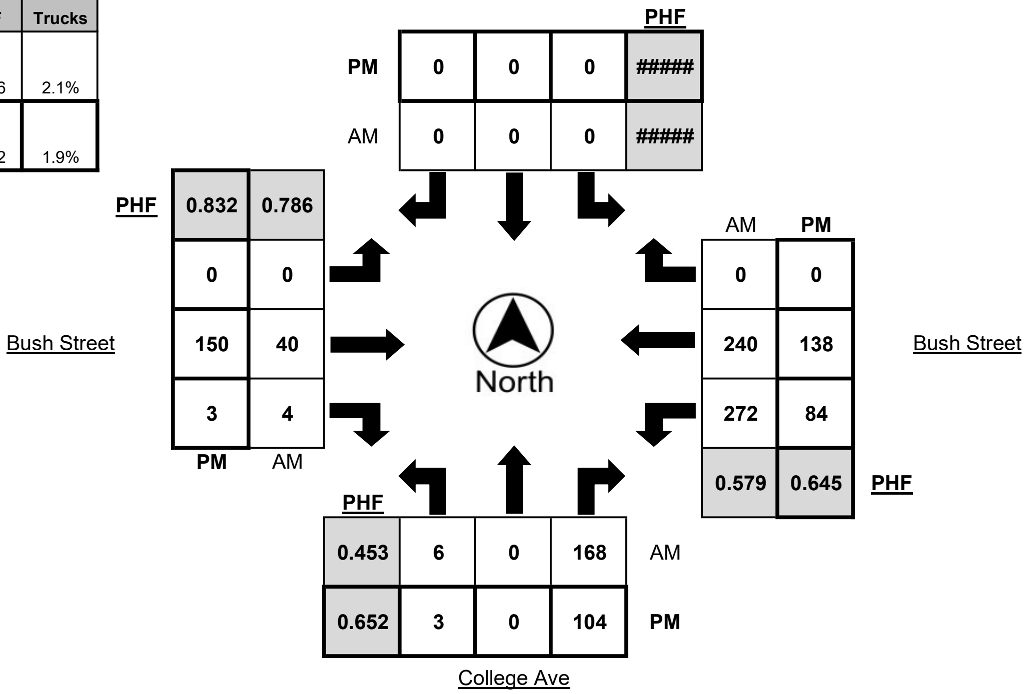
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	1	0	9	1	0	0	0	0	0	3	0	0	19	19	0	1
7:15 AM - 7:30 AM	0	0	8	0	0	0	0	0	0	8	0	0	50	39	0	2
7:30 AM - 7:45 AM	2	0	42	2	0	0	0	0	0	13	1	0	75	47	0	2
7:45 AM - 8:00 AM	2	0	94	1	0	0	0	0	0	10	1	1	107	114	0	0
8:00 AM - 8:15 AM	2	0	24	4	0	0	0	0	0	9	2	0	40	40	0	3
8:15 AM - 8:30 AM	2	0	17	1	0	0	0	0	0	13	2	0	30	17	0	2
8:30 AM - 8:45 AM	3	0	31	2	0	0	0	0	0	11	2	0	69	65	0	3
8:45 AM - 9:00 AM	6	0	32	2	0	0	0	0	0	33	4	0	66	141	0	1
TOTAL	**18**	**0**	**257**	**13**	**0**	**0**	**0**	**0**	**0**	**100**	**12**	**1**	**456**	**482**	**0**	**14**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	1	0	33	0	0	0	0	0	0	14	2	0	13	25	0	1
4:15 PM - 4:30 PM	0	0	14	1	0	0	0	0	0	20	0	0	17	12	0	1
4:30 PM - 4:45 PM	2	0	32	2	0	0	0	0	0	18	3	0	24	11	0	2
4:45 PM - 5:00 PM	3	0	32	0	0	0	0	0	0	46	0	0	29	57	0	1
5:00 PM - 5:15 PM	0	0	41	2	0	0	0	0	0	44	2	0	18	27	0	2
5:15 PM - 5:30 PM	0	0	13	0	0	0	0	0	0	23	0	0	20	34	0	0
5:30 PM - 5:45 PM	0	0	18	2	0	0	0	0	0	37	1	0	17	20	0	2
5:45 PM - 6:00 PM	2	0	19	0	0	0	0	0	0	26	1	0	9	24	0	0
TOTAL	**8**	**0**	**202**	**7**	**0**	**0**	**0**	**0**	**0**	**228**	**9**	**0**	**147**	**210**	**0**	**9**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	6	0	168	7	0	0	0	0	0	40	4	1	272	240	0	7
4:45 PM - 5:45 PM	3	0	104	4	0	0	0	0	0	150	3	0	84	138	0	5

	PHF	**Trucks**
AM	0.556	2.1%
PM	0.722	1.9%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:
ND Engineering
6807 Leameadow
Dallas, TX 75248

LOCATION Bush St @ Belle Haven Dr

LATITUDE 36.2962

COUNTY Kings

LONGITUDE -119.8129

COLLECTION DATE Wednesday, August 29, 2018

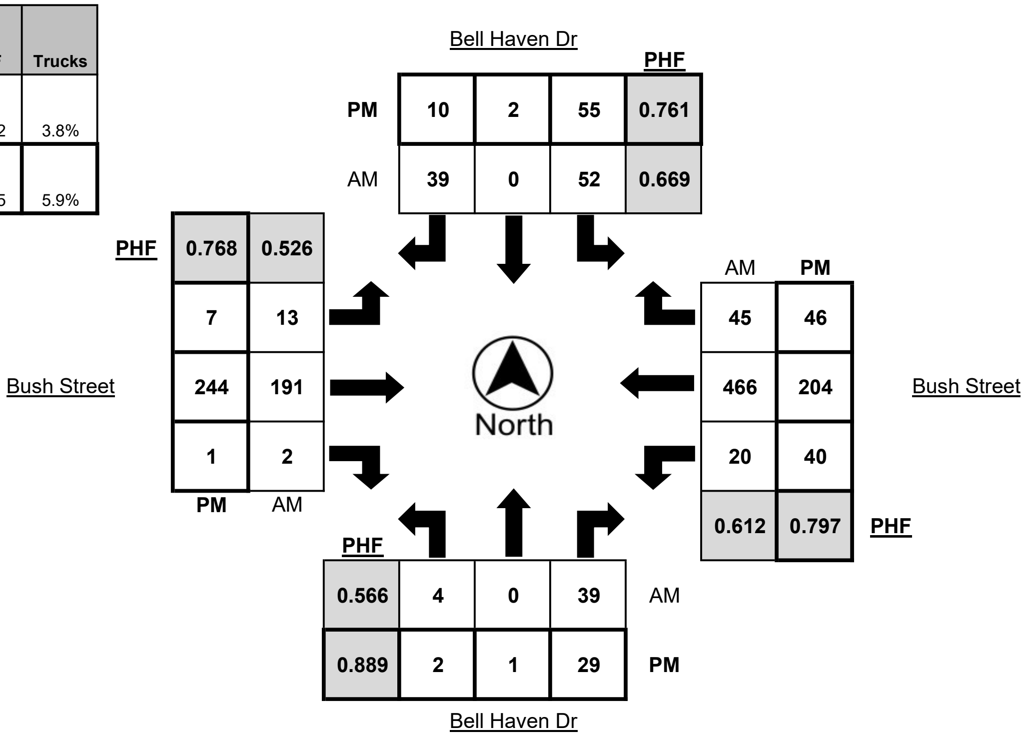
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	0	5	1	17	0	3	2	3	9	0	1	0	41	12	3
7:15 AM - 7:30 AM	1	0	8	0	13	0	7	3	0	20	0	0	6	89	11	6
7:30 AM - 7:45 AM	1	0	11	1	16	0	9	3	4	54	0	2	5	122	12	3
7:45 AM - 8:00 AM	2	0	17	0	15	0	19	2	9	87	2	1	5	202	10	3
8:00 AM - 8:15 AM	0	0	3	1	8	0	4	2	0	30	0	4	4	53	12	2
8:15 AM - 8:30 AM	0	0	9	0	9	1	2	5	0	31	1	2	3	48	7	5
8:30 AM - 8:45 AM	2	0	6	0	4	0	4	1	0	43	0	2	3	147	11	4
8:45 AM - 9:00 AM	2	1	3	0	10	0	16	3	0	60	2	1	4	182	14	7
TOTAL	**8**	**1**	**62**	**3**	**92**	**1**	**64**	**21**	**16**	**334**	**5**	**13**	**30**	**884**	**89**	**33**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	0	5	0	14	1	0	2	0	46	1	1	8	30	5	2
4:15 PM - 4:30 PM	0	0	6	0	19	0	2	5	1	35	0	0	9	28	7	2
4:30 PM - 4:45 PM	0	0	5	0	20	0	3	1	0	54	0	2	12	43	11	6
4:45 PM - 5:00 PM	1	0	8	0	15	0	2	2	1	81	0	0	6	76	9	5
5:00 PM - 5:15 PM	0	0	8	0	6	0	3	1	3	73	0	2	12	45	13	5
5:15 PM - 5:30 PM	1	0	5	1	17	0	5	5	2	30	1	0	13	47	9	2
5:30 PM - 5:45 PM	0	1	8	0	17	2	0	5	1	60	0	2	9	36	15	8
5:45 PM - 6:00 PM	0	0	4	0	7	1	0	0	1	39	0	0	12	26	9	0
TOTAL	**2**	**1**	**49**	**1**	**115**	**4**	**15**	**21**	**9**	**418**	**2**	**7**	**81**	**331**	**78**	**30**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	4	0	39	2	52	0	39	10	13	191	2	7	20	466	45	14
4:45 PM - 5:45 PM	2	1	29	1	55	2	10	13	7	244	1	4	40	204	46	20

	PHF	Trucks
AM	0.592	3.8%
PM	0.805	5.9%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

ND Engineering
6807 Leameadow
Dallas, TX 75248

LOCATION Bush St @ SR-41 SB Ramps

LATITUDE 36.2964

COUNTY Kings

LONGITUDE -119.8116

COLLECTION DATE Wednesday, August 29, 2018

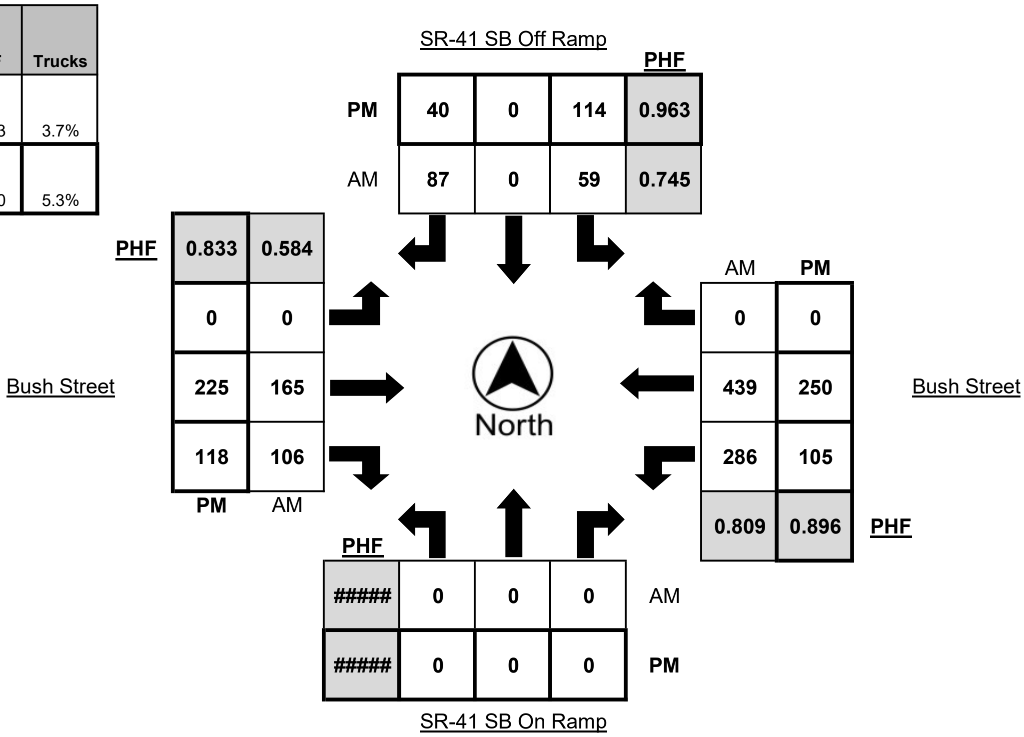
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 7:15 AM	0	0	0	0	16	0	13	3	0	14	14	5	81	48	0	4
7:15 AM - 7:30 AM	0	0	0	0	14	0	10	2	0	20	20	2	88	100	0	8
7:30 AM - 7:45 AM	0	0	0	0	18	0	31	1	0	64	23	6	71	113	0	4
7:45 AM - 8:00 AM	0	0	0	0	11	0	33	1	0	67	49	2	46	178	0	4
8:00 AM - 8:15 AM	0	0	0	0	10	0	15	0	0	28	12	7	30	53	0	2
8:15 AM - 8:30 AM	0	0	0	0	10	0	7	2	0	31	18	6	23	57	0	8
8:30 AM - 8:45 AM	0	0	0	0	12	0	29	2	0	41	13	3	22	138	0	7
8:45 AM - 9:00 AM	0	0	0	0	19	0	37	3	0	50	27	4	26	163	0	9
TOTAL	**0**	**0**	**0**	**0**	**110**	**0**	**175**	**14**	**0**	**315**	**176**	**35**	**387**	**850**	**0**	**46**

	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
4:00 PM - 4:15 PM	0	0	0	0	27	0	8	0	0	44	18	3	24	43	0	3
4:15 PM - 4:30 PM	0	0	0	0	30	0	10	0	0	38	22	4	20	34	0	2
4:30 PM - 4:45 PM	0	0	0	0	35	0	12	1	0	52	27	3	20	55	0	6
4:45 PM - 5:00 PM	0	0	0	0	25	0	15	0	0	68	35	2	21	78	0	6
5:00 PM - 5:15 PM	0	0	0	0	27	0	8	0	0	73	29	5	15	56	0	5
5:15 PM - 5:30 PM	0	0	0	0	27	0	13	1	0	34	17	7	40	58	0	4
5:30 PM - 5:45 PM	0	0	0	0	35	0	4	2	0	50	37	6	29	58	0	7
5:45 PM - 6:00 PM	0	0	0	0	27	0	10	0	0	37	14	0	19	35	0	2
TOTAL	**0**	**0**	**0**	**0**	**233**	**0**	**80**	**4**	**0**	**396**	**199**	**30**	**188**	**417**	**0**	**35**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 8:00 AM	0	0	0	0	59	0	87	7	0	165	106	15	286	439	0	20
4:45 PM - 5:45 PM	0	0	0	0	114	0	40	3	0	225	118	20	105	250	0	22

	PHF	Trucks
AM	0.743	3.7%
PM	0.880	5.3%



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Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

ND Engineering
6807 Leameadow
Dallas, TX 75248

LOCATION Bush St @ SR-41 NB Ramps

LATITUDE 36.2966

COUNTY Kings

LONGITUDE -119.8099

COLLECTION DATE Wednesday, August 29, 2018

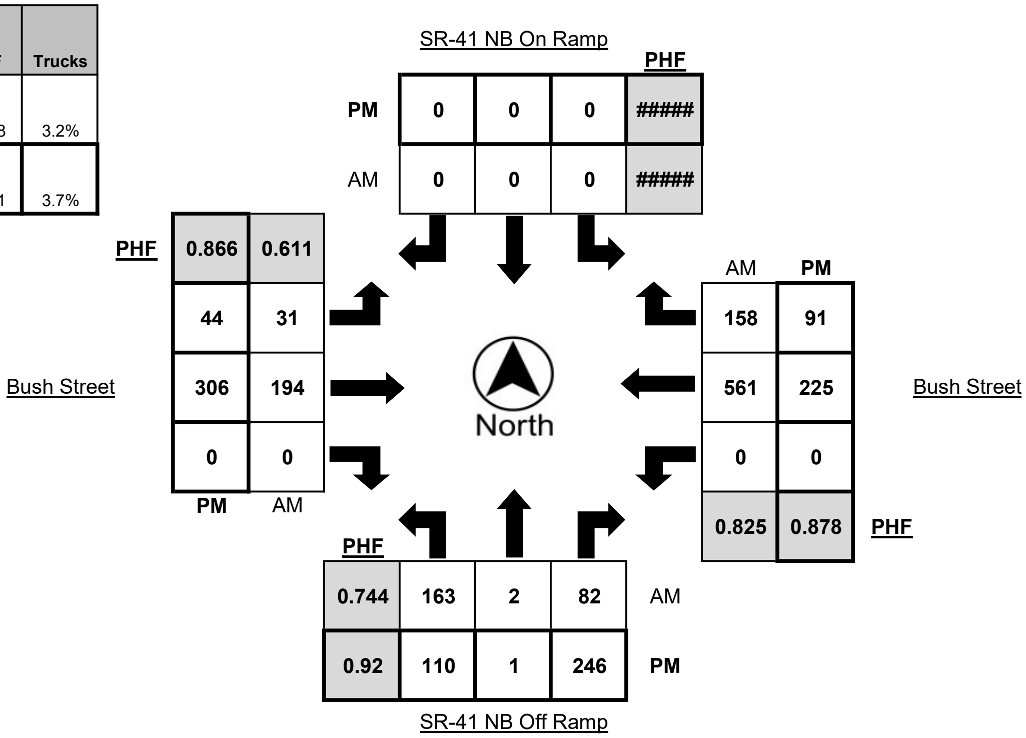
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	24	0	11	3	0	0	0	0	1	31	0	2	0	109	32	3
7:15 AM - 7:30 AM	48	2	16	5	0	0	0	0	3	28	0	1	0	129	51	4
7:30 AM - 7:45 AM	41	0	22	2	0	0	0	0	15	55	0	2	0	138	42	5
7:45 AM - 8:00 AM	50	0	33	3	0	0	0	0	12	80	0	4	0	185	33	4
8:00 AM - 8:15 AM	24	0	27	1	0	0	0	0	7	33	0	2	0	74	23	4
8:15 AM - 8:30 AM	24	0	20	4	0	0	0	0	8	31	0	4	0	50	25	4
8:30 AM - 8:45 AM	55	0	16	3	0	0	0	0	6	46	0	2	0	90	12	4
8:45 AM - 9:00 AM	64	0	16	4	0	0	0	0	14	54	0	3	0	135	11	5
TOTAL	**330**	**2**	**161**	**25**	**0**	**0**	**0**	**0**	**66**	**358**	**0**	**20**	**0**	**910**	**229**	**33**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	15	0	47	2	0	0	0	0	11	63	0	1	0	50	31	3
4:15 PM - 4:30 PM	14	0	17	2	0	0	0	0	6	50	0	1	0	41	30	2
4:30 PM - 4:45 PM	24	0	61	7	0	0	0	0	12	74	0	3	0	42	21	2
4:45 PM - 5:00 PM	35	0	62	6	0	0	0	0	11	86	0	2	0	63	27	2
5:00 PM - 5:15 PM	27	1	69	1	0	0	0	0	16	85	0	1	0	51	24	6
5:15 PM - 5:30 PM	24	0	54	2	0	0	0	0	5	61	0	4	0	69	19	2
5:30 PM - 5:45 PM	23	0	43	3	0	0	0	0	9	59	0	1	0	57	27	4
5:45 PM - 6:00 PM	19	0	40	2	0	0	0	0	5	68	0	2	0	51	18	1
TOTAL	**181**	**1**	**393**	**25**	**0**	**0**	**0**	**0**	**75**	**546**	**0**	**15**	**0**	**424**	**197**	**22**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 8:00 AM	163	2	82	13	0	0	0	0	31	194	0	9	0	561	158	16
4:30 PM - 5:30 PM	110	1	246	16	0	0	0	0	44	306	0	10	0	225	91	12

	PHF	**Trucks**
AM	0.758	3.2%
PM	0.901	3.7%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:
ND Engineering
6807 Leameadow
Dallas, TX 75248

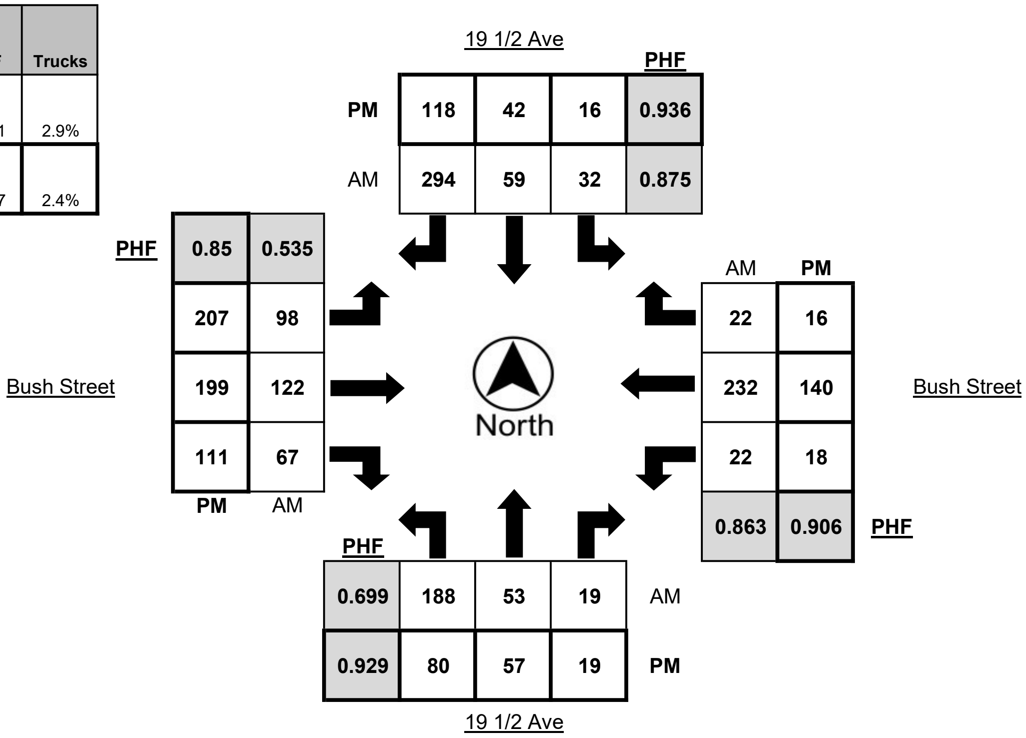
LOCATION Bush St @ 19 1/2 Ave
LATITUDE 36.2983
COUNTY Kings
LONGITUDE -119.8078
COLLECTION DATE Wednesday, August 29, 2018
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	29	10	3	0	7	7	69	2	14	15	12	1	4	41	1	3
7:15 AM - 7:30 AM	40	14	7	1	6	10	82	0	14	18	9	2	5	62	7	3
7:30 AM - 7:45 AM	49	10	5	3	13	17	64	2	23	26	22	3	7	65	8	3
7:45 AM - 8:00 AM	70	19	4	3	6	25	79	2	47	63	24	6	6	64	6	1
8:00 AM - 8:15 AM	26	10	4	0	8	16	24	2	26	23	11	3	5	43	8	3
8:15 AM - 8:30 AM	20	11	8	0	3	4	27	2	18	23	10	4	1	26	3	2
8:30 AM - 8:45 AM	26	7	6	1	4	8	43	2	23	24	13	3	6	40	0	2
8:45 AM - 9:00 AM	42	5	5	2	4	5	45	1	20	28	22	4	7	53	1	1
TOTAL	**302**	**86**	**42**	**10**	**51**	**92**	**433**	**13**	**185**	**220**	**123**	**26**	**41**	**394**	**34**	**18**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	16	10	2	0	6	8	22	1	41	47	16	0	7	45	6	3
4:15 PM - 4:30 PM	16	12	5	0	2	9	17	0	47	47	17	1	6	37	5	2
4:30 PM - 4:45 PM	18	9	4	0	4	6	18	1	37	42	30	3	2	27	2	1
4:45 PM - 5:00 PM	20	10	5	1	4	6	29	1	64	60	28	6	3	39	2	1
5:00 PM - 5:15 PM	22	12	4	3	4	16	25	0	63	54	29	1	3	26	5	2
5:15 PM - 5:30 PM	20	18	4	1	3	9	33	0	51	43	28	3	8	35	5	1
5:30 PM - 5:45 PM	18	17	6	0	5	11	31	2	29	42	26	1	4	40	4	2
5:45 PM - 6:00 PM	16	13	4	1	8	12	19	0	44	54	10	2	8	31	5	0
TOTAL	**146**	**101**	**34**	**6**	**36**	**77**	**194**	**5**	**376**	**389**	**184**	**17**	**41**	**280**	**34**	**12**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 8:00 AM	188	53	19	7	32	59	294	6	98	122	67	12	22	232	22	10
4:45 PM - 5:45 PM	80	57	19	5	16	42	118	3	207	199	111	11	18	140	16	6

	PHF	**Trucks**
AM	0.731	2.9%
PM	0.947	2.4%



APPENDIX A-2

KINGS CAG MODEL DATA

KCAG 2018 No-Build
Daily/AM/PM Volume

Daily
AM
PM

cube

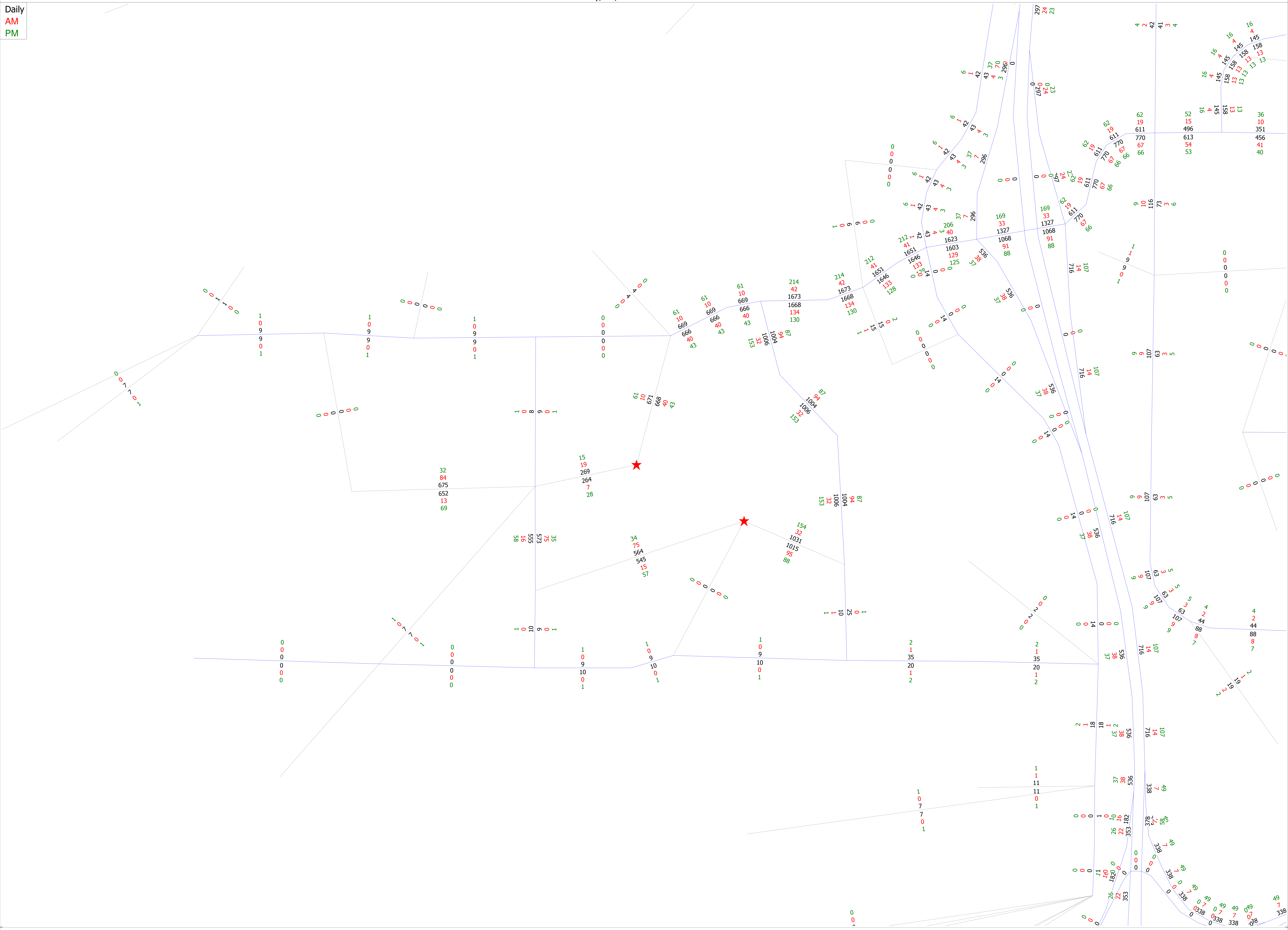
(Licensed to Kittelson and Associates Inc)

KCAG 2035 No-Build
Daily/AM/PM Volume

KCAG 2018 Build

Daily/AM/PM Select Link Volume

Daily
AM
PM



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APPENDIX B

EXISTING (2018) CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Intersection	
Int Delay, s/veh	7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	⅄	
Traffic Vol, veh/h	40	4	272	240	6	168
Future Vol, veh/h	40	4	272	240	6	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	58	58	45	45
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	5	469	414	13	373

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	56	0	1403	51
Stage 1	-	-	-	-	51	-
Stage 2	-	-	-	-	1352	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1549	-	154	1017
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	241	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1549	-	107	1017
Mov Cap-2 Maneuver	-	-	-	-	107	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	168	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.4	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	786	-	-	1549	-
HCM Lane V/C Ratio	0.492	-	-	0.303	-
HCM Control Delay (s)	13.9	-	-	8.3	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	2.8	-	-	1.3	-

Intersection	
Intersection Delay, s/veh	29.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	14	191	3	20	466	45	5	0	39	52	0	41
Future Vol, veh/h	14	191	3	20	466	45	5	0	39	52	0	41
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	26	360	6	33	764	74	9	0	68	78	0	61
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	34.3	20.8	12.3	12.9
HCM LOS	D	C	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	7%	8%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	92%	92%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	1%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	39	208	253	238	41	52	0	41
LT Vol	5	0	14	20	0	0	52	0	0
Through Vol	0	0	191	233	233	0	0	0	0
RT Vol	0	39	3	0	5	41	0	0	41
Lane Flow Rate	9	68	392	415	389	66	78	0	61
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.023	0.153	0.806	0.717	0.668	0.101	0.194	0	0.132
Departure Headway (Hd)	9.308	8.069	7.389	6.226	6.172	5.474	9.02	8.506	7.785
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	384	444	491	585	588	659	398	0	460
Service Time	7.069	5.829	5.134	3.926	3.872	3.174	6.777	6.262	5.542
HCM Lane V/C Ratio	0.023	0.153	0.798	0.709	0.662	0.1	0.196	0	0.133
HCM Control Delay	12.3	12.3	34.3	23.1	20.4	8.8	13.9	11.3	11.7
HCM Lane LOS	B	B	D	C	C	A	B	N	B
HCM 95th-tile Q	0.1	0.5	7.6	5.9	5	0.3	0.7	0	0.5

Intersection	
Int Delay, s/veh	17.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	171	111	286	442	0	0	0	0	59	0	89
Future Vol, veh/h	0	171	111	286	442	0	0	0	0	59	0	89
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	295	191	353	546	0	0	0	0	80	0	120

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	486	0	0	1644	1738	274
Stage 1	-	-	-	-	-	-	1252	1252	-
Stage 2	-	-	-	-	-	-	392	486	-
Critical Hdwy	-	-	-	4.16	-	-	6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	1063	-	0	98	85	719
Stage 1	0	-	-	-	-	0	230	240	-
Stage 2	0	-	-	-	-	0	677	546	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1063	-	-	~ 65	0	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 65	0	-
Stage 1	-	-	-	-	-	-	230	0	-
Stage 2	-	-	-	-	-	-	452	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4	123.6
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1063	-	65	718
HCM Lane V/C Ratio	-	-	0.332	-	1.227	0.168
HCM Control Delay (s)	-	-	10.1	-	293.5	11
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	1.5	-	6.5	0.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

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	32	198	0	0	564	158	164	2	82	0	0	0
Future Vol, veh/h	32	198	0	0	564	158	164	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	52	325	0	0	688	193	222	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	881	0	-	-	-	0	773	1310	325
Stage 1	-	-	-	-	-	-	429	429	-
Stage 2	-	-	-	-	-	-	344	881	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	760	-	0	0	-	-	349	157	713
Stage 1	-	-	0	0	-	-	653	581	-
Stage 2	-	-	0	0	-	-	688	362	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	760	-	-	-	-	-	325	0	713
Mov Cap-2 Maneuver	-	-	-	-	-	-	325	0	-
Stage 1	-	-	-	-	-	-	609	0	-
Stage 2	-	-	-	-	-	-	688	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.4	0	28.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	325	713	760	-	-	-
HCM Lane V/C Ratio	0.69	0.155	0.069	-	-	-
HCM Control Delay (s)	37.5	11	10.1	-	-	-
HCM Lane LOS	E	B	B	-	-	-
HCM 95th %tile Q(veh)	4.8	0.5	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	23.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	95	118	67	22	234	22	190	53	19	32	59	298
Future Vol, veh/h	95	118	67	22	234	22	190	53	19	32	59	298
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	176	219	124	26	272	26	271	76	27	36	67	339
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	18.8	17.8	27.7	29.3
HCM LOS	C	C	D	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	78%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	22%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	190	53	19	95	118	67	22	156	100	32	59
LT Vol	190	0	0	95	0	0	22	0	0	32	0
Through Vol	0	53	0	0	118	0	0	156	78	0	59
RT Vol	0	0	19	0	0	67	0	0	22	0	0
Lane Flow Rate	271	76	27	176	219	124	26	181	116	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.717	0.19	0.063	0.453	0.532	0.278	0.069	0.466	0.294	0.095	0.166
Departure Headway (Hd)	9.511	9.011	8.311	9.262	8.762	8.062	9.745	9.245	9.091	9.426	8.926
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	380	398	430	389	411	445	368	390	395	380	402
Service Time	7.268	6.768	6.068	7.017	6.517	5.817	7.505	7.005	6.851	7.182	6.682
HCM Lane V/C Ratio	0.713	0.191	0.063	0.452	0.533	0.279	0.071	0.464	0.294	0.095	0.167
HCM Control Delay	33.1	13.9	11.6	19.5	21.1	13.9	13.2	19.9	15.6	13.2	13.5
HCM Lane LOS	D	B	B	C	C	B	B	C	C	B	B
HCM 95th-tile Q	5.4	0.7	0.2	2.3	3	1.1	0.2	2.4	1.2	0.3	0.6

Intersection	
Int Delay, s/veh	4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	Y	
Traffic Vol, veh/h	155	3	84	138	3	109
Future Vol, veh/h	155	3	84	138	3	109
Conflicting Peds, #/hr	0	0	0	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	65	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	187	4	129	212	5	168

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	191	0	659	189
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	472	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1383	-	429	853
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1383	-	388	851
Mov Cap-2 Maneuver	-	-	-	-	388	-
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	568	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	825	-	-	1383	-
HCM Lane V/C Ratio	0.209	-	-	0.093	-
HCM Control Delay (s)	10.5	-	-	7.9	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	0.3	-

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	7	256	1	40	206	46	4	1	31	57	2	12
Future Vol, veh/h	7	256	1	40	206	46	4	1	31	57	2	12
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	9	332	1	50	258	58	4	1	35	75	3	16
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	15.8	9.7	9.5	10.9
HCM LOS	C	A	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	3%	28%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	97%	72%	96%	0%	0%	100%	0%
Vol Right, %	0%	97%	0%	0%	4%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	32	264	143	108	41	57	2	12
LT Vol	4	0	7	40	0	0	57	0	0
Through Vol	0	1	256	103	103	0	0	2	0
RT Vol	0	31	1	0	5	41	0	0	12
Lane Flow Rate	4	36	343	179	134	52	75	3	16
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.009	0.063	0.558	0.279	0.203	0.069	0.152	0.005	0.027
Departure Headway (Hd)	7.462	6.263	5.862	5.617	5.446	4.771	7.273	6.766	6.057
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	480	571	617	644	663	756	494	529	591
Service Time	5.206	4.006	3.591	3.317	3.146	2.471	5.011	4.505	3.795
HCM Lane V/C Ratio	0.008	0.063	0.556	0.278	0.202	0.069	0.152	0.006	0.027
HCM Control Delay	10.3	9.4	15.8	10.5	9.5	7.8	11.3	9.5	9
HCM Lane LOS	B	A	C	B	A	A	B	A	A
HCM 95th-tile Q	0	0.2	3.4	1.1	0.8	0.2	0.5	0	0.1

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	0	226	118	105	250	0	0	0	0	115	0	42
Future Vol, veh/h	0	226	118	105	250	0	0	0	0	115	0	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	272	142	117	278	0	0	0	0	120	0	44

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	414	0	0				855	926	139
Stage 1	-	-	-	-	-	-				512	512	-
Stage 2	-	-	-	-	-	-				343	414	-
Critical Hdwy	-	-	-	4.175	-	-				6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-				5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-				3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	1125	-	0				308	264	876
Stage 1	0	-	-	-	-	0				560	529	-
Stage 2	0	-	-	-	-	0				710	586	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1125	-	-				276	0	876
Mov Cap-2 Maneuver	-	-	-	-	-	-				276	0	-
Stage 1	-	-	-	-	-	-				560	0	-
Stage 2	-	-	-	-	-	-				636	0	-

Approach	EB			WB						SB		
HCM Control Delay, s	0			2.5						22.8		
HCM LOS										C		

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1125	-	276	876
HCM Lane V/C Ratio	-	-	0.104	-	0.434	0.05
HCM Control Delay (s)	-	-	8.6	-	27.7	9.3
HCM Lane LOS	-	-	A	-	D	A
HCM 95th %tile Q(veh)	-	-	0.3	-	2.1	0.2

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	44	297	0	0	240	98	115	1	237	0	0	0
Future Vol, veh/h	44	297	0	0	240	98	115	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	51	341	0	0	273	111	125	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	384	0	-	-	-	0	580	827	341
Stage 1	-	-	-	-	-	-	443	443	-
Stage 2	-	-	-	-	-	-	137	384	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1160	-	0	0	-	-	457	303	695
Stage 1	-	-	0	0	-	-	641	571	-
Stage 2	-	-	0	0	-	-	870	606	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1160	-	-	-	-	-	437	0	695
Mov Cap-2 Maneuver	-	-	-	-	-	-	437	0	-
Stage 1	-	-	-	-	-	-	613	0	-
Stage 2	-	-	-	-	-	-	870	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.1	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	437	695	1160	-	-	-
HCM Lane V/C Ratio	0.289	0.371	0.044	-	-	-
HCM Control Delay (s)	16.5	13.2	8.2	-	-	-
HCM Lane LOS	C	B	A	-	-	-
HCM 95th %tile Q(veh)	1.2	1.7	0.1	-	-	-

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	214	206	114	18	140	16	80	57	19	16	42	118
Future Vol, veh/h	214	206	114	18	140	16	80	57	19	16	42	118
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	252	242	134	20	154	18	86	61	20	17	45	126
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	13.5	11.2	11.5	11.1
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	74%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	26%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	80	57	19	214	206	114	18	93	63	16	42
LT Vol	80	0	0	214	0	0	18	0	0	16	0
Through Vol	0	57	0	0	206	0	0	93	47	0	42
RT Vol	0	0	19	0	0	114	0	0	16	0	0
Lane Flow Rate	86	61	20	252	242	134	20	103	69	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.185	0.123	0.037	0.472	0.421	0.207	0.042	0.201	0.132	0.037	0.09
Departure Headway (Hd)	7.752	7.252	6.552	6.751	6.251	5.551	7.562	7.062	6.883	7.74	7.24
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	461	492	543	531	574	644	471	506	518	460	492
Service Time	5.537	5.037	4.337	4.512	4.012	3.312	5.342	4.842	4.663	5.522	5.022
HCM Lane V/C Ratio	0.187	0.124	0.037	0.475	0.422	0.208	0.042	0.204	0.133	0.037	0.091
HCM Control Delay	12.3	11.1	9.6	15.5	13.5	9.8	10.7	11.6	10.7	10.8	10.7
HCM Lane LOS	B	B	A	C	B	A	B	B	B	B	B
HCM 95th-tile Q	0.7	0.4	0.1	2.5	2.1	0.8	0.1	0.7	0.5	0.1	0.3

APPENDIX C

EXISTING (2018) CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

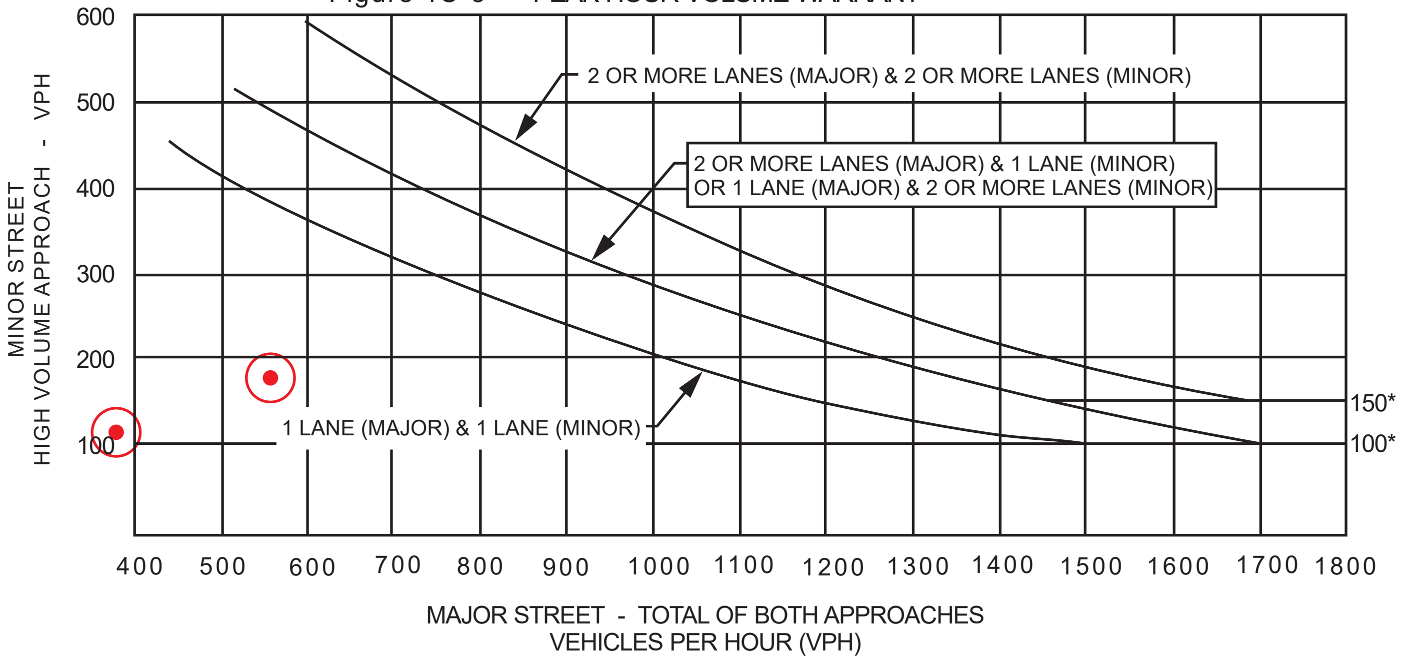
CONDITION: EXISTING (2018)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	556	380			
Highest Approaches - Minor Street	✓		174	112			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 40 mph

Critical speed of major street traffic > 40 mph ☐ or

In built up area of isolated community of < 10,000 pop. ☐ RURAL (R)

☒ URBAN (U)

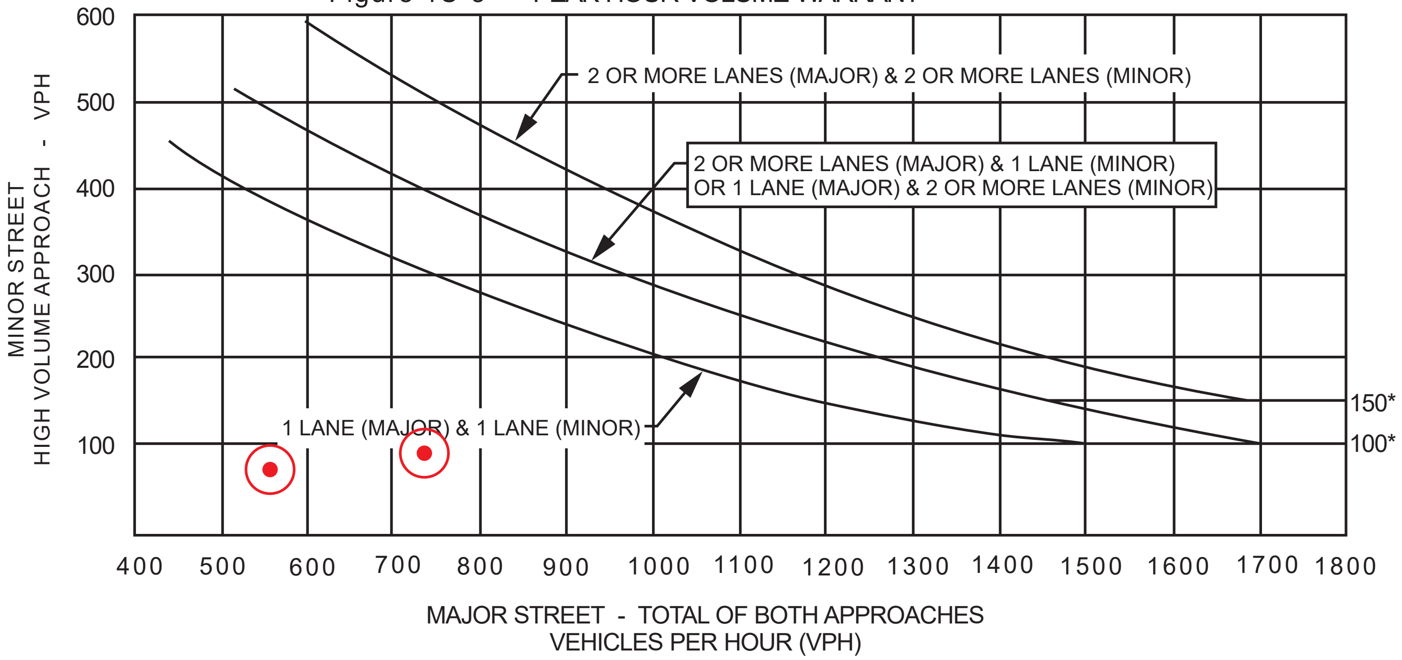
CONDITION: EXISTING (2018)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	739	556			
Highest Approaches - Minor Street	✓		93	71			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ---------------- ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. --------- ☐

☒ URBAN (U)

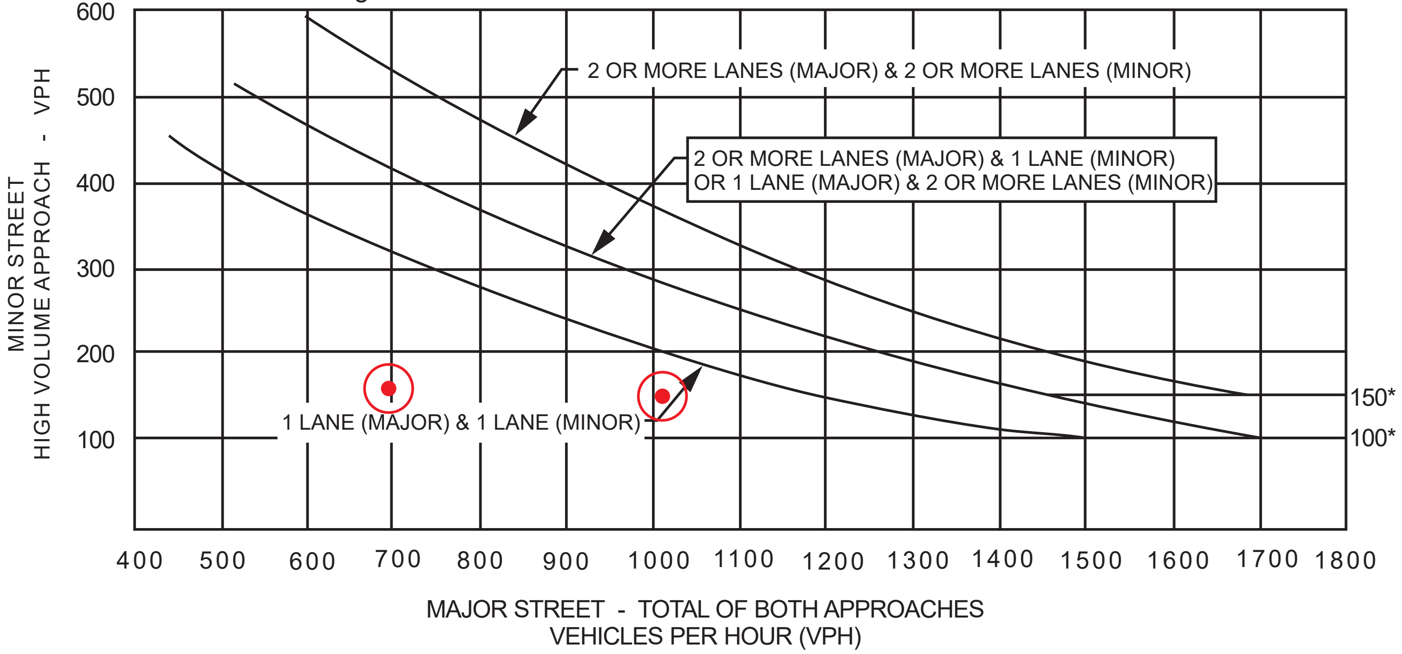
CONDITION: EXISTING (2018)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1010	699			
Highest Approaches - Minor Street	✓		148	157			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐
☒ URBAN (U)

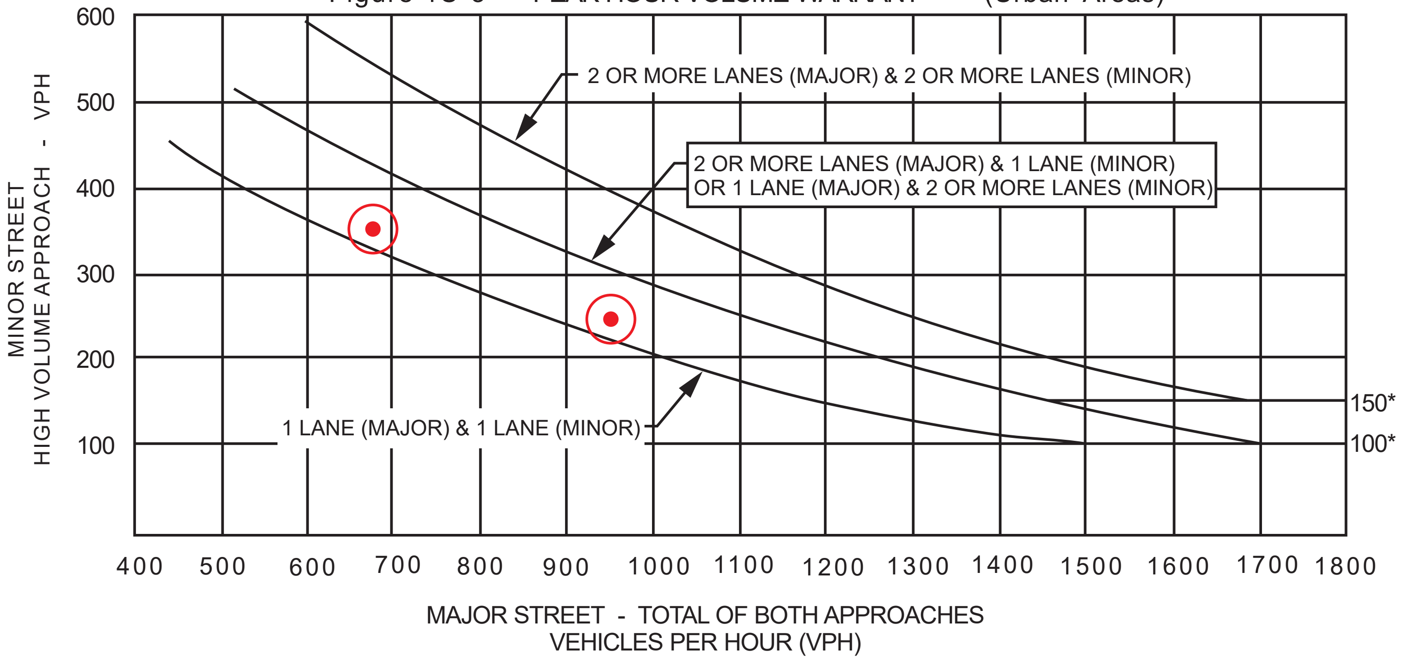
CONDITION: EXISTING (2018)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	952	679			
Highest Approaches - Minor Street	✓		248	353			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

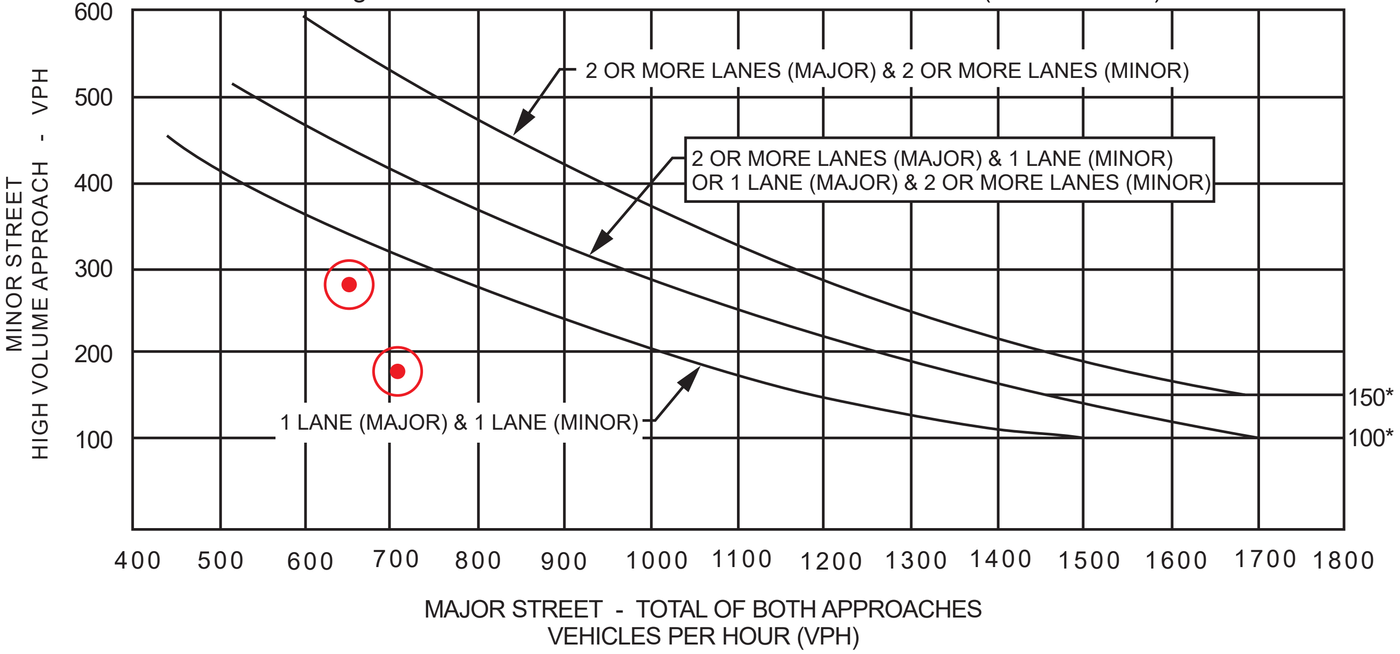
CONDITION: EXISTING (2018)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	651	708			
Highest Approaches - Minor Street	✓		280	176			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX D

EXISTING (2018) PLUS PROJECT PHASE 1 CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Existing + Project Phase 1 AM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	40	4	280	240	6	201
Future Vol, veh/h	40	4	280	240	6	201
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	58	58	45	45
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	5	483	414	13	447

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	56	0	1431	51
Stage 1	-	-	-	-	51	-
Stage 2	-	-	-	-	1380	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1549	-	148	1017
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	233	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1549	-	102	1017
Mov Cap-2 Maneuver	-	-	-	-	102	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	160	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	807	-	-	1549	-
HCM Lane V/C Ratio	0.57	-	-	0.312	-
HCM Control Delay (s)	15.2	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	3.7	-	-	1.3	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	239	2	16	516	4	39
Future Vol, veh/h	239	2	16	516	4	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	53	53	58	58	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	451	4	28	890	7	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	455	0	1399	453
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	946	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1106	-	155	607
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	377	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1106	-	147	607
Mov Cap-2 Maneuver	-	-	-	-	147	-
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	358	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	470	-	-	1106	-
HCM Lane V/C Ratio	0.166	-	-	0.025	-
HCM Control Delay (s)	14.2	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	44.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰↑↑↱	↱	↰	↱		↰	↑	↱
Traffic Vol, veh/h	16	256	6	20	486	45	5	0	39	52	0	41
Future Vol, veh/h	16	256	6	20	486	45	5	0	39	52	0	41
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	30	483	11	33	797	74	9	0	68	78	0	61
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	92.3	23.7	13.1	13.7
HCM LOS	F	C	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	6%	8%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	92%	92%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	2%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	39	278	263	248	41	52	0	41
LT Vol	5	0	16	20	0	0	52	0	0
Through Vol	0	0	256	243	243	0	0	0	0
RT Vol	0	39	6	0	5	41	0	0	41
Lane Flow Rate	9	68	525	431	406	66	78	0	61
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.023	0.158	1.083	0.754	0.704	0.103	0.199	0	0.137
Departure Headway (Hd)	9.976	8.727	7.432	6.509	6.457	5.756	9.648	9.129	8.403
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	361	413	488	560	564	627	374	0	430
Service Time	7.676	6.427	5.225	4.209	4.157	3.456	7.348	6.829	6.103
HCM Lane V/C Ratio	0.025	0.165	1.076	0.77	0.72	0.105	0.209	0	0.142
HCM Control Delay	12.9	13.1	92.3	26.5	23.1	9.1	14.7	11.8	12.4
HCM Lane LOS	B	B	F	D	C	A	B	N	B
HCM 95th-tile Q	0.1	0.6	16.6	6.6	5.6	0.3	0.7	0	0.5

Intersection	
Int Delay, s/veh	22.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	217	130	286	458	0	0	0	0	59	0	93
Future Vol, veh/h	0	217	130	286	458	0	0	0	0	59	0	93
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	374	224	353	565	0	0	0	0	80	0	126

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	598	0	0				1758	1869	284
Stage 1	-	-	-	-	-	-				1271	1271	-
Stage 2	-	-	-	-	-	-				487	598	-
Critical Hdwy	-	-	-	4.16	-	-				6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-				5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-				3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	965	-	0				83	71	708
Stage 1	0	-	-	-	-	0				225	235	-
Stage 2	0	-	-	-	-	0				612	486	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	965	-	-				~ 53	0	707
Mov Cap-2 Maneuver	-	-	-	-	-	-				~ 53	0	-
Stage 1	-	-	-	-	-	-				225	0	-
Stage 2	-	-	-	-	-	-				388	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.2	173.4
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	965	-	53	707
HCM Lane V/C Ratio	-	-	0.366	-	1.504	0.178
HCM Control Delay (s)	-	-	10.9	-	$ 429	11.2
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	1.7	-	7.4	0.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	44	232	0	0	573	158	171	2	82	0	0	0
Future Vol, veh/h	44	232	0	0	573	158	171	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	72	380	0	0	699	193	231	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	892	0	-	-	-	0	874	1416	380
Stage 1	-	-	-	-	-	-	524	524	-
Stage 2	-	-	-	-	-	-	350	892	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	753	-	0	0	-	-	303	136	663
Stage 1	-	-	0	0	-	-	591	527	-
Stage 2	-	-	0	0	-	-	683	358	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	753	-	-	-	-	-	274	0	663
Mov Cap-2 Maneuver	-	-	-	-	-	-	274	0	-
Stage 1	-	-	-	-	-	-	534	0	-
Stage 2	-	-	-	-	-	-	683	0	-

Approach	EB			WB			NB
HCM Control Delay, s	1.6			0			46.7
HCM LOS							E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	274	663	753	-	-	-
HCM Lane V/C Ratio	0.853	0.167	0.096	-	-	-
HCM Control Delay (s)	63.4	11.5	10.3	-	-	-
HCM Lane LOS	F	B	B	-	-	-
HCM 95th %tile Q(veh)	7.2	0.6	0.3	-	-	-

Intersection	
Intersection Delay, s/veh	26.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	98	144	72	22	241	22	191	53	19	32	59	299
Future Vol, veh/h	98	144	72	22	241	22	191	53	19	32	59	299
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	181	267	133	26	280	26	273	76	27	36	67	340
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	22.4	19	30.2	32.7
HCM LOS	C	C	D	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	191	53	19	98	144	72	22	161	102	32	59
LT Vol	191	0	0	98	0	0	22	0	0	32	0
Through Vol	0	53	0	0	144	0	0	161	80	0	59
RT Vol	0	0	19	0	0	72	0	0	22	0	0
Lane Flow Rate	273	76	27	181	267	133	26	187	119	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.744	0.196	0.065	0.475	0.66	0.304	0.071	0.495	0.31	0.098	0.172
Departure Headway (Hd)	9.819	9.319	8.619	9.415	8.915	8.215	10.034	9.534	9.383	9.729	9.229
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	368	385	415	383	405	437	357	377	383	368	388
Service Time	7.586	7.086	6.386	7.176	6.676	5.976	7.803	7.303	7.152	7.491	6.991
HCM Lane V/C Ratio	0.742	0.197	0.065	0.473	0.659	0.304	0.073	0.496	0.311	0.098	0.173
HCM Control Delay	36.4	14.4	12	20.5	27.5	14.6	13.6	21.4	16.3	13.6	13.9
HCM Lane LOS	E	B	B	C	D	B	B	C	C	B	B
HCM 95th-tile Q	5.8	0.7	0.2	2.5	4.6	1.3	0.2	2.6	1.3	0.3	0.6

Existing + Project Phase 1 PM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	4.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	155	3	111	138	3	118
Future Vol, veh/h	155	3	111	138	3	118
Conflicting Peds, #/hr	0	0	0	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	65	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	187	4	171	212	5	182

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	191	0	743	189
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	556	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1383	-	383	853
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1383	-	335	851
Mov Cap-2 Maneuver	-	-	-	-	335	-
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	502	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.6	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	820	-	-	1383	-
HCM Lane V/C Ratio	0.227	-	-	0.123	-
HCM Control Delay (s)	10.7	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.9	-	-	0.4	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	272	1	67	245	4	34
Future Vol, veh/h	272	1	67	245	4	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	65	65	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	353	1	103	377	6	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	354	0	937	354
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	583	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1205	-	294	690
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	558	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1205	-	262	690
Mov Cap-2 Maneuver	-	-	-	-	262	-
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	589	-	-	1205	-
HCM Lane V/C Ratio	0.091	-	-	0.086	-
HCM Control Delay (s)	11.7	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.3	-

3: Belle Haven & Bush Street

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	8	295	3	40	291	46	6	1	31	57	2	15
Future Vol, veh/h	8	295	3	40	291	46	6	1	31	57	2	15
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	10	383	4	50	364	58	7	1	35	75	3	20
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	20.7	10.9	10.1	11.4
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	3%	22%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	96%	78%	97%	0%	0%	100%	0%
Vol Right, %	0%	97%	1%	0%	3%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	32	306	186	150	41	57	2	15
LT Vol	6	0	8	40	0	0	57	0	0
Through Vol	0	1	295	146	145	0	0	2	0
RT Vol	0	31	3	0	5	41	0	0	15
Lane Flow Rate	7	36	397	232	188	52	75	3	20
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.015	0.067	0.676	0.367	0.291	0.07	0.162	0.005	0.036
Departure Headway (Hd)	7.961	6.757	6.126	5.704	5.574	4.889	7.752	7.243	6.531
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	449	529	592	631	645	732	462	493	547
Service Time	5.721	4.516	3.862	3.436	3.305	2.62	5.506	4.997	4.285
HCM Lane V/C Ratio	0.016	0.068	0.671	0.368	0.291	0.071	0.162	0.006	0.037
HCM Control Delay	10.8	10	20.7	11.7	10.6	8	12	10	9.5
HCM Lane LOS	B	A	C	B	B	A	B	A	A
HCM 95th-tile Q	0	0.2	5.1	1.7	1.2	0.2	0.6	0	0.1

Existing + Project Phase 1 PM
4: SR 41 SB Ramp & Bush Street

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	254	129	105	320	0	0	0	0	115	0	57
Future Vol, veh/h	0	254	129	105	320	0	0	0	0	115	0	57
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	306	155	117	356	0	0	0	0	120	0	59

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	461	0	0				974	1051	178
Stage 1	-	-	-	-	-	-				590	590	-
Stage 2	-	-	-	-	-	-				384	461	-
Critical Hdwy	-	-	-	4.175	-	-				6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-				5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-				3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	1080	-	0				259	222	827
Stage 1	0	-	-	-	-	0				511	488	-
Stage 2	0	-	-	-	-	0				680	558	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1080	-	-				231	0	827
Mov Cap-2 Maneuver	-	-	-	-	-	-				231	0	-
Stage 1	-	-	-	-	-	-				511	0	-
Stage 2	-	-	-	-	-	-				607	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.2	27.4
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1080	-	231	827
HCM Lane V/C Ratio	-	-	0.108	-	0.519	0.072
HCM Control Delay (s)	-	-	8.7	-	36.2	9.7
HCM Lane LOS	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	-	0.4	-	2.7	0.2

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	51	318	0	0	269	98	156	1	237	0	0	0
Future Vol, veh/h	51	318	0	0	269	98	156	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	59	366	0	0	306	111	170	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	417	0	-	-	-	0	637	901	366
Stage 1	-	-	-	-	-	-	484	484	-
Stage 2	-	-	-	-	-	-	153	417	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1128	-	0	0	-	-	421	274	673
Stage 1	-	-	0	0	-	-	614	547	-
Stage 2	-	-	0	0	-	-	854	586	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1128	-	-	-	-	-	399	0	673
Mov Cap-2 Maneuver	-	-	-	-	-	-	399	0	-
Stage 1	-	-	-	-	-	-	582	0	-
Stage 2	-	-	-	-	-	-	854	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.2	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	399	673	1128	-	-	-
HCM Lane V/C Ratio	0.428	0.383	0.052	-	-	-
HCM Control Delay (s)	20.6	13.6	8.4	-	-	-
HCM Lane LOS	C	B	A	-	-	-
HCM 95th %tile Q(veh)	2.1	1.8	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	215	222	118	18	161	16	84	57	19	16	42	122
Future Vol, veh/h	215	222	118	18	161	16	84	57	19	16	42	122
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	253	261	139	20	177	18	90	61	20	17	45	130
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.1	11.6	11.9	11.4
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	77%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	23%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	84	57	19	215	222	118	18	107	70	16	42
LT Vol	84	0	0	215	0	0	18	0	0	16	0
Through Vol	0	57	0	0	222	0	0	107	54	0	42
RT Vol	0	0	19	0	0	118	0	0	16	0	0
Lane Flow Rate	90	61	20	253	261	139	20	118	77	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.198	0.126	0.038	0.482	0.461	0.218	0.042	0.235	0.149	0.037	0.092
Departure Headway (Hd)	7.907	7.407	6.707	6.861	6.361	5.661	7.666	7.166	7.005	7.895	7.395
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	452	481	530	524	564	630	464	498	508	451	482
Service Time	5.7	5.2	4.5	4.63	4.13	3.43	5.457	4.957	4.796	5.686	5.186
HCM Lane V/C Ratio	0.199	0.127	0.038	0.483	0.463	0.221	0.043	0.237	0.152	0.038	0.093
HCM Control Delay	12.7	11.3	9.8	15.9	14.5	10	10.8	12.2	11	11	10.9
HCM Lane LOS	B	B	A	C	B	A	B	B	B	B	B
HCM 95th-tile Q	0.7	0.4	0.1	2.6	2.4	0.8	0.1	0.9	0.5	0.1	0.3

APPENDIX E

EXISTING (2018) PLUS PROJECT PHASE 1 CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or

In built up area of isolated community of < 10,000 pop. ☐ RURAL (R)

☒ URBAN (U)

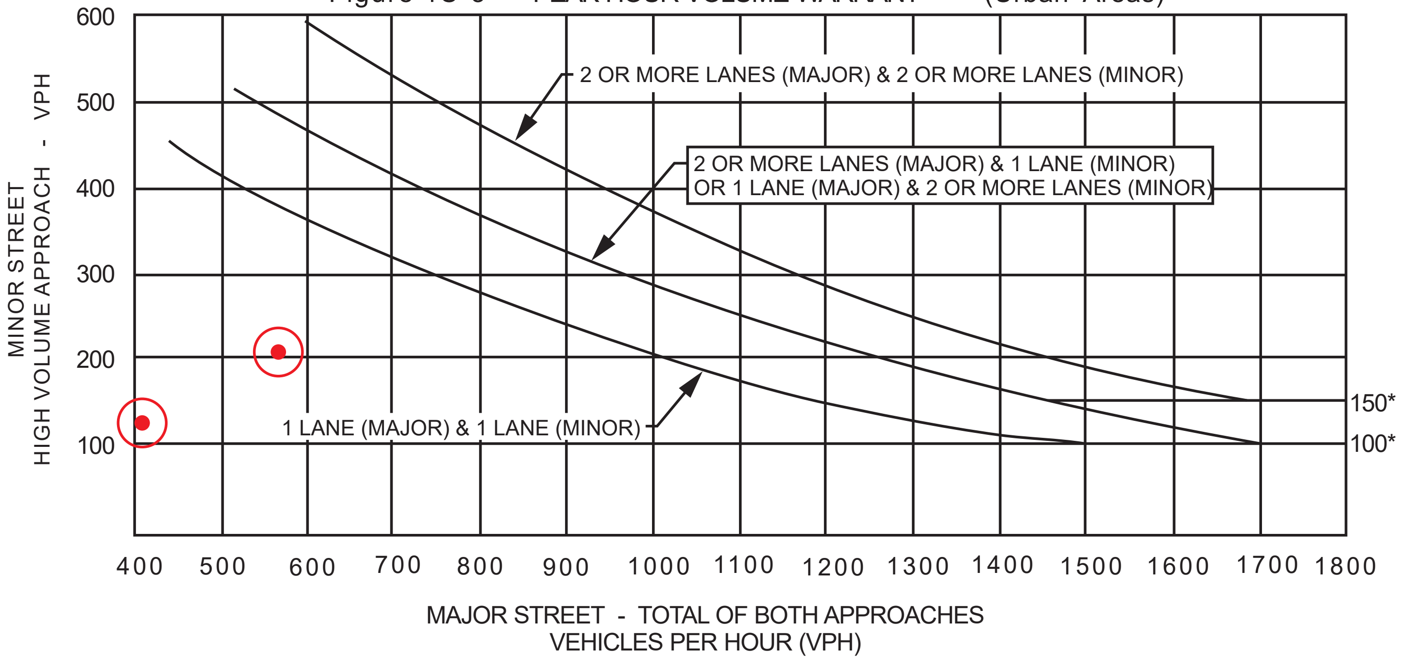
CONDITION: EXISTING (2018) + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	566	408			
Highest Approaches - Minor Street	✓		207	122			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: SEMAS Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

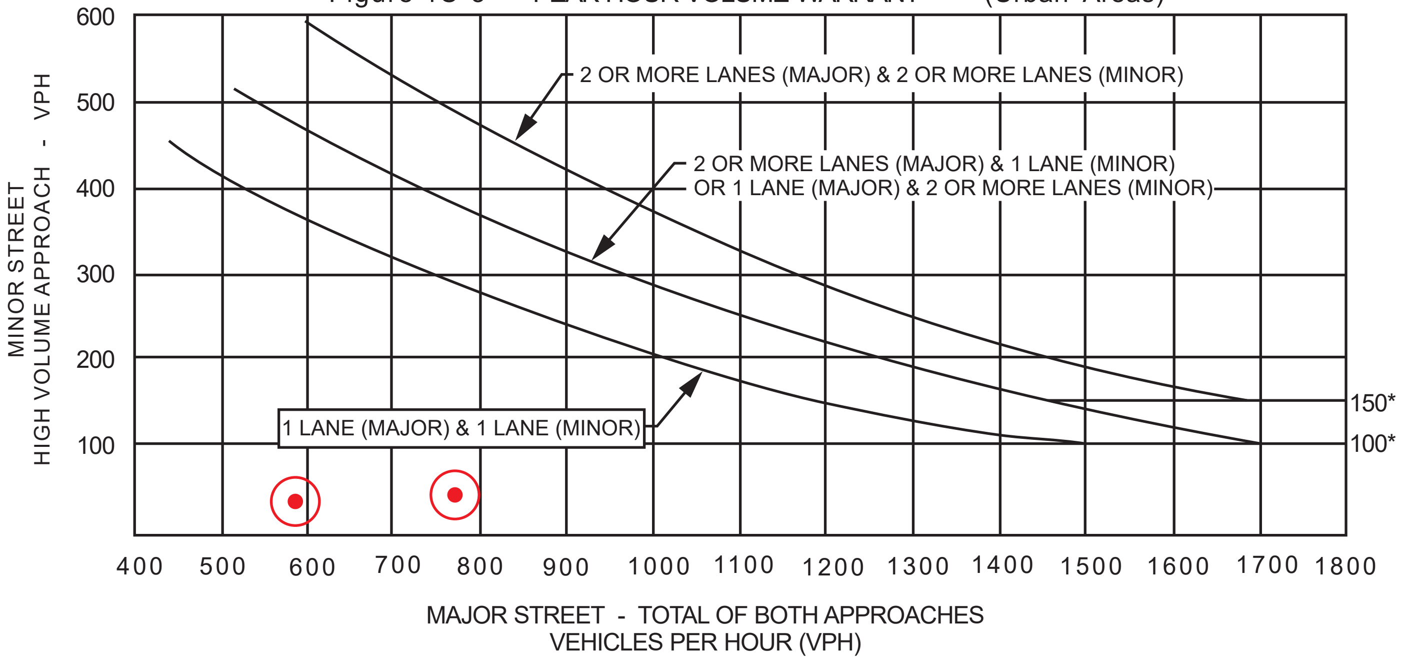
CONDITION: EXISTING (2018) + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street	✓		773	585			
Highest Approaches - Minor Street	✓		43	38			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/28/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 40 mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

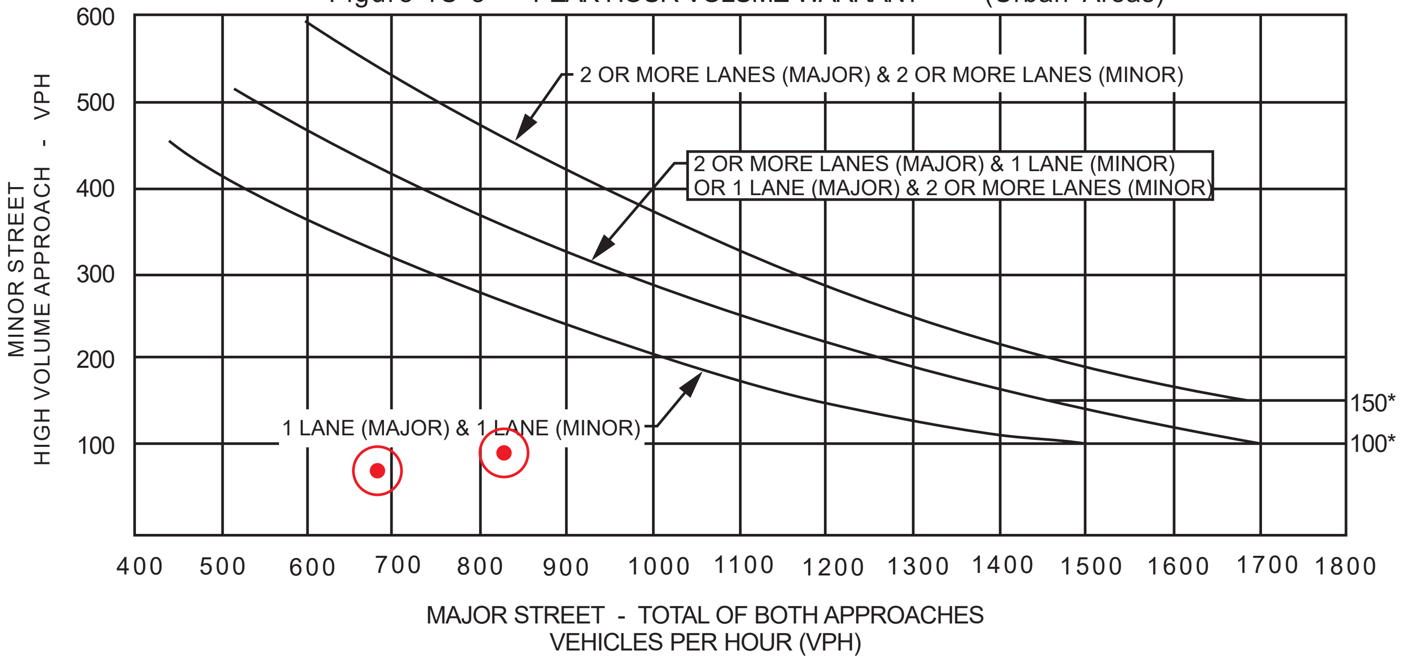
CONDITION: EXISTING (2018) + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	829	684			
Highest Approaches - Minor Street	✓		93	74			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

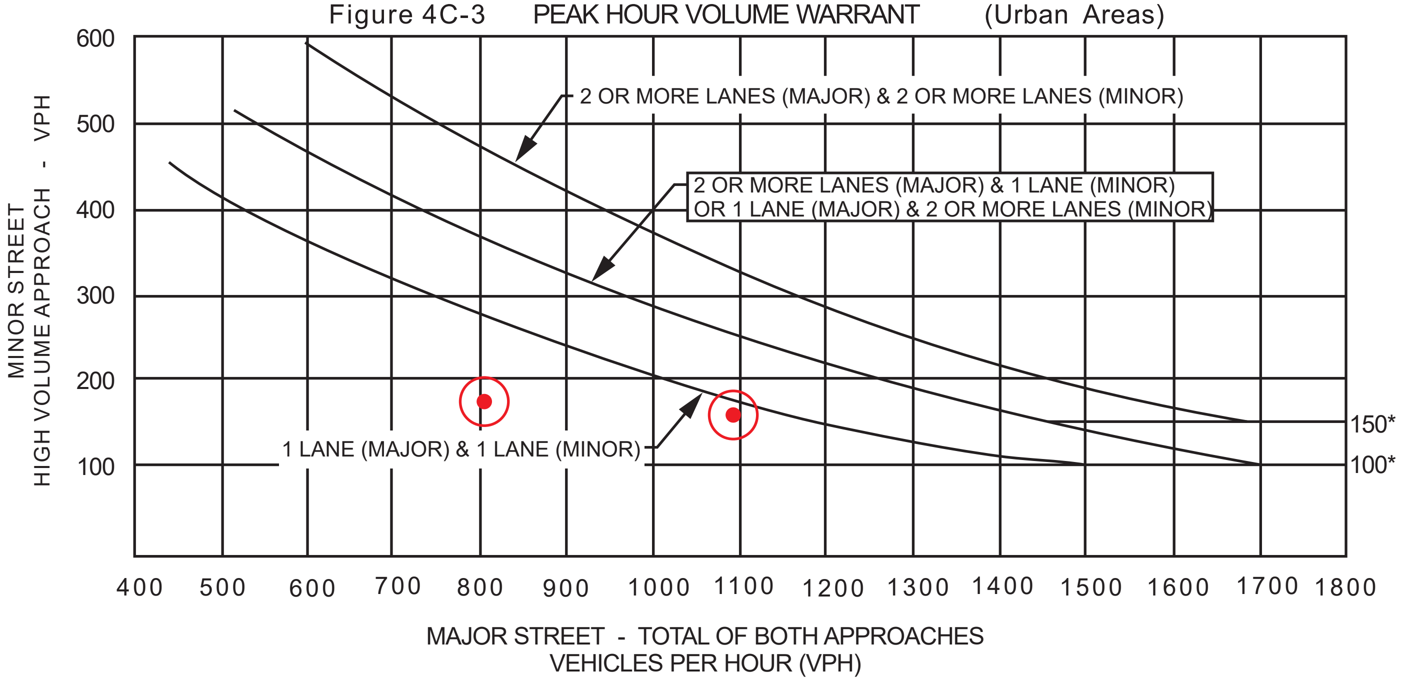
CONDITION: EXISTING (2018) + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1091	808			
Highest Approaches - Minor Street	✓		152	172			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

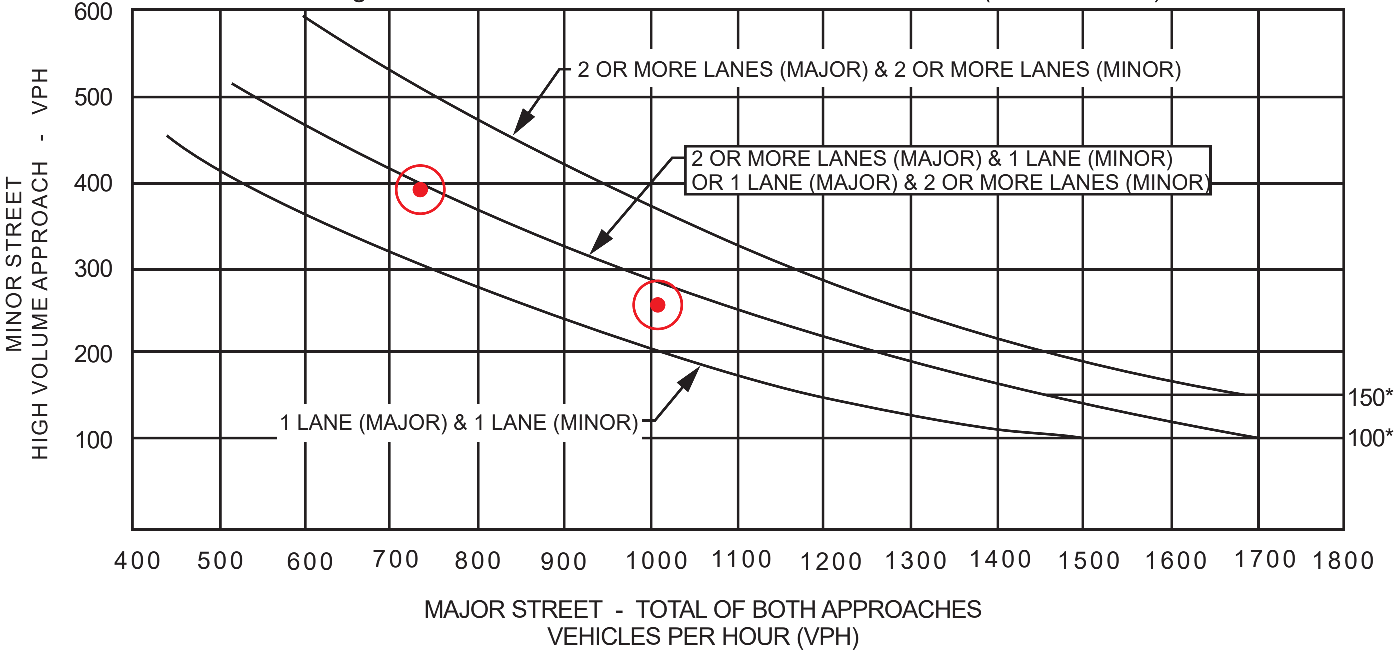
CONDITION: EXISTING (2018) + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1008	736			
Highest Approaches - Minor Street	✓		255	394			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

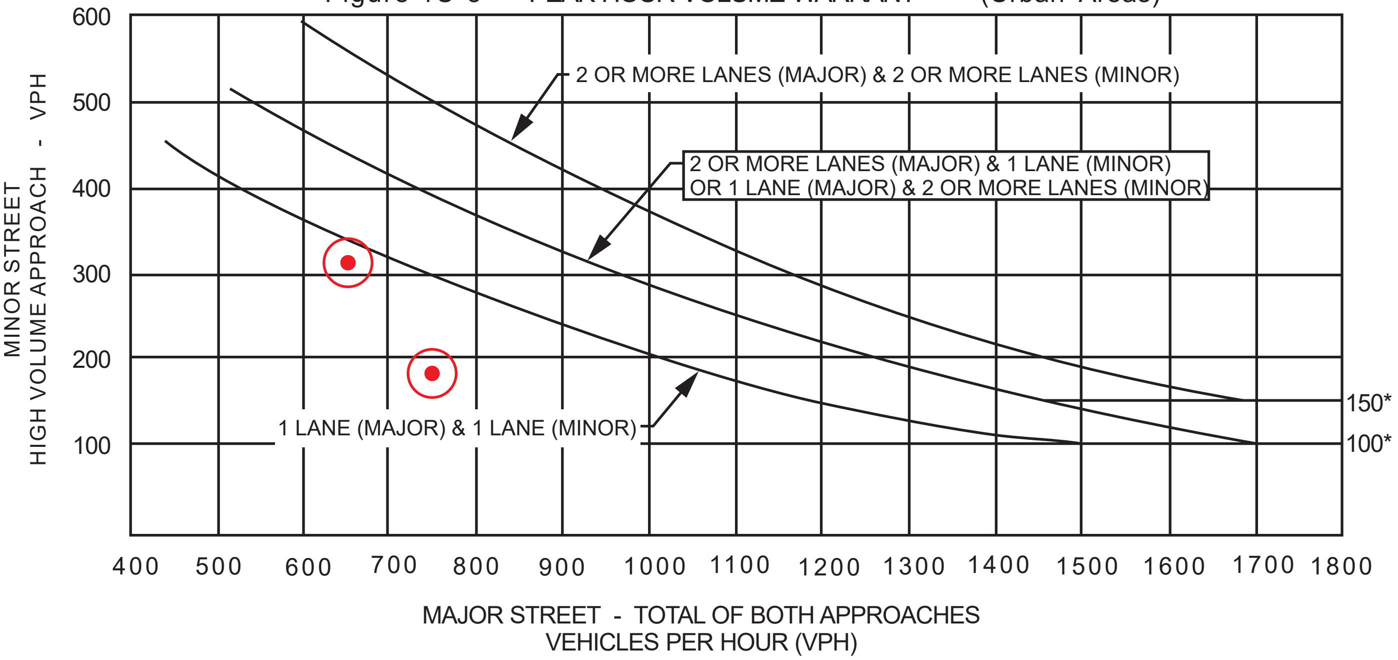
CONDITION: EXISTING (2018) + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	654	750			
Highest Approaches - Minor Street	✓		313	180			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX F

MITIGATED

EXISTING (2018) PLUS PROJECT PHASE 1 CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Mitigated Existing + Project Phase 1 AM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	40	4	280	240	6	201
Future Vol, veh/h	40	4	280	240	6	201
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	58	58	45	45
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	5	483	414	13	447

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	56	0	1431	51
Stage 1	-	-	-	-	51	-
Stage 2	-	-	-	-	1380	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1549	-	148	1017
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	233	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1549	-	102	1017
Mov Cap-2 Maneuver	-	-	-	-	102	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	160	-

Approach	EB		WB		NB
HCM Control Delay, s	0		4.5		15.2
HCM LOS					C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	807	-	-	1549	-
HCM Lane V/C Ratio	0.57	-	-	0.312	-
HCM Control Delay (s)	15.2	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	3.7	-	-	1.3	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	239	2	16	516	4	39
Future Vol, veh/h	239	2	16	516	4	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	53	53	58	58	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	451	4	28	890	7	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	455	0	1399	453
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	946	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1106	-	155	607
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	377	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1106	-	147	607
Mov Cap-2 Maneuver	-	-	-	-	147	-
Stage 1	-	-	-	-	640	-
Stage 2	-	-	-	-	358	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	470	-	-	1106	-
HCM Lane V/C Ratio	0.166	-	-	0.025	-
HCM Control Delay (s)	14.2	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	30	494	33	797	74	9	68	78	61
v/c Ratio	0.17	0.92	0.19	0.78	0.12	0.05	0.08	0.40	0.06
Control Delay	35.6	51.7	24.8	22.7	0.4	33.4	0.2	39.6	0.1
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	51.8	24.8	22.8	0.4	33.4	0.2	39.6	0.1
Queue Length 50th (ft)	14	229	15	118	0	4	0	37	0
Queue Length 95th (ft)	23	173	25	71	0	11	0	57	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	173	554	173	1055	603	173	864	199	1014
Starvation Cap Reductn	0	0	0	5	0	0	0	0	0
Spillback Cap Reductn	0	1	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.89	0.19	0.76	0.12	0.05	0.08	0.39	0.06

Intersection Summary

Mitigated Existing + Project Phase 1 AM

3: Belle Haven & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	16	256	6	20	486	45	5	0	39	52	0	41
Future Volume (veh/h)	16	256	6	20	486	45	5	0	39	52	0	41
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		0.97	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	30	483	11	33	797	74	9	0	68	78	0	61
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	85	522	12	91	1030	448	32	0	404	304	762	646
Arrive On Green	0.05	0.29	0.29	0.10	0.59	0.59	0.02	0.00	0.26	0.17	0.00	0.41
Sat Flow, veh/h	1753	1793	41	1753	3497	1521	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	30	0	494	33	797	74	9	0	68	78	0	61
Grp Sat Flow(s),veh/h/ln	1753	0	1833	1753	1749	1521	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	1.3	0.0	20.9	1.4	13.8	1.1	0.4	0.0	2.7	3.1	0.0	1.9
Cycle Q Clear(g_c), s	1.3	0.0	20.9	1.4	13.8	1.1	0.4	0.0	2.7	3.1	0.0	1.9
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	85	0	534	91	1030	448	32	0	404	304	762	646
V/C Ratio(X)	0.35	0.00	0.93	0.36	0.77	0.17	0.28	0.00	0.17	0.26	0.00	0.09
Avail Cap(c_a), veh/h	175	0	552	175	1054	458	175	0	404	304	762	646
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.8	0.0	27.5	34.6	14.4	4.2	38.8	0.0	23.0	28.6	0.0	14.3
Incr Delay (d2), s/veh	2.5	0.0	21.4	2.3	3.5	0.2	4.8	0.0	0.9	0.4	0.0	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	0.6	0.0	11.6	0.6	3.9	0.6	0.2	0.0	1.0	1.3	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.3	0.0	48.9	36.9	17.9	4.4	43.5	0.0	23.9	29.1	0.0	14.6
LnGrp LOS	D	A	D	D	B	A	D	A	C	C	A	B
Approach Vol, veh/h		524			904			77			139	
Approach Delay, s/veh		48.4			17.5			26.2			22.7	
Approach LOS		D			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.4	25.2	8.7	27.8	6.0	37.6	8.4	28.0				
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	9.2	20.7	8.0	24.1	8.0	21.9	8.0	24.1				
Max Q Clear Time (g_c+I1), s	5.1	4.7	3.4	22.9	2.4	3.9	3.3	15.8				
Green Ext Time (p_c), s	0.0	0.2	0.0	0.4	0.0	0.1	0.0	3.5				
Intersection Summary												
HCM 6th Ctrl Delay			28.2									
HCM 6th LOS			C									

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	374	224	353	565	80	126
v/c Ratio	0.80	0.40	0.81	0.29	0.14	0.22
Control Delay	16.6	1.9	40.9	5.3	23.5	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	1.9	40.9	5.3	23.5	6.1
Queue Length 50th (ft)	48	0	162	15	30	0
Queue Length 95th (ft)	40	1	236	54	54	23
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	536	614	509	2234	560	580
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.36	0.69	0.25	0.14	0.22

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	217	130	286	458	0	0	0	0	59	0	93
Future Volume (veh/h)	0	217	130	286	458	0	0	0	0	59	0	93
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	374	224	353	565	0				80	0	126
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	440	372	398	1826	0				641	0	570
Arrive On Green	0.00	0.24	0.24	0.23	0.52	0.00				0.37	0.00	0.37
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1559
Grp Volume(v), veh/h	0	374	224	353	565	0				80	0	126
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1559
Q Serve(g_s), s	0.0	15.5	10.2	15.6	7.4	0.0				2.4	0.0	4.5
Cycle Q Clear(g_c), s	0.0	15.5	10.2	15.6	7.4	0.0				2.4	0.0	4.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	440	372	398	1826	0				641	0	570
V/C Ratio(X)	0.00	0.85	0.60	0.89	0.31	0.00				0.12	0.00	0.22
Avail Cap(c_a), veh/h	0	541	458	515	2251	0				641	0	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.42	0.42	0.57	0.57	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	29.1	27.1	29.9	10.9	0.0				16.9	0.0	17.5
Incr Delay (d2), s/veh	0.0	4.7	0.7	8.7	0.1	0.0				0.4	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	7.1	3.7	7.2	2.5	0.0				1.0	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	33.8	27.7	38.7	11.0	0.0				17.3	0.0	18.4
LnGrp LOS	A	C	C	D	B	A				B	A	B
Approach Vol, veh/h		598			918						206	
Approach Delay, s/veh		31.5			21.6						18.0	
Approach LOS		C			C						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			22.7	23.6		33.7		46.3				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			23.5	23.5		19.5		51.5				
Max Q Clear Time (g_c+I1), s			17.6	17.5		6.5		9.4				
Green Ext Time (p_c), s			0.6	1.6		0.6		4.2				
Intersection Summary												
HCM 6th Ctrl Delay			24.6									
HCM 6th LOS			C									

5: SR 41 NB Ramp & Bush Street

	↗	→	←	↑	↱
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	72	380	892	234	111
v/c Ratio	0.37	0.43	0.75	0.32	0.16
Control Delay	19.8	10.5	26.0	20.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	10.5	26.0	20.8	5.2
Queue Length 50th (ft)	18	34	191	82	0
Queue Length 95th (ft)	28	10	203	126	21
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	229	1095	1403	721	708
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.35	0.64	0.32	0.16

Intersection Summary

Mitigated Existing + Project Phase 1 AM
5: SR 41 NB Ramp & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	44	232	0	0	573	158	171	2	82	0	0	0
Future Volume (veh/h)	44	232	0	0	573	158	171	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	72	380	0	0	699	193	231	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	141	840	0	0	859	237	759	10	684			
Arrive On Green	0.16	0.91	0.00	0.00	0.32	0.32	0.43	0.43	0.43			
Sat Flow, veh/h	1767	1856	0	0	2808	749	1746	23	1572			
Grp Volume(v), veh/h	72	380	0	0	454	438	234	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1702	1768	0	1572			
Q Serve(g_s), s	3.0	2.6	0.0	0.0	19.0	19.0	6.9	0.0	3.4			
Cycle Q Clear(g_c), s	3.0	2.6	0.0	0.0	19.0	19.0	6.9	0.0	3.4			
Prop In Lane	1.00		0.00	0.00		0.44	0.99		1.00			
Lane Grp Cap(c), veh/h	141	840	0	0	558	538	769	0	684			
V/C Ratio(X)	0.51	0.45	0.00	0.00	0.81	0.81	0.30	0.00	0.16			
Avail Cap(c_a), veh/h	232	1102	0	0	716	691	769	0	684			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.50	0.50	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	32.2	2.2	0.0	0.0	25.2	25.2	14.7	0.0	13.7			
Incr Delay (d2), s/veh	1.4	0.2	0.0	0.0	5.6	5.8	1.0	0.0	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			
%ile BackOfQ(50%),veh/ln	1.2	0.7	0.0	0.0	8.2	8.0	2.8	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.6	2.4	0.0	0.0	30.8	31.0	15.7	0.0	14.2			
LnGrp LOS	C	A	A	A	C	C	B	A	B			
Approach Vol, veh/h		452			892			345				
Approach Delay, s/veh		7.4			30.9			15.3				
Approach LOS		A			C			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		39.3		40.7			10.9	29.8				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		23.5		47.5			10.5	32.5				
Max Q Clear Time (g_c+I1), s		8.9		4.6			5.0	21.0				
Green Ext Time (p_c), s		1.5		2.5			0.1	4.3				
Intersection Summary												
HCM 6th Ctrl Delay			21.4									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	26.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	98	144	72	22	241	22	191	53	19	32	59	299
Future Vol, veh/h	98	144	72	22	241	22	191	53	19	32	59	299
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	181	267	133	26	280	26	273	76	27	36	67	340
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	22.4	19	30.2	32.7
HCM LOS	C	C	D	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	191	53	19	98	144	72	22	161	102	32	59	299
LT Vol	191	0	0	98	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	144	0	0	161	80	0	59	0
RT Vol	0	0	19	0	0	72	0	0	22	0	0	299
Lane Flow Rate	273	76	27	181	267	133	26	187	119	36	67	340
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.744	0.196	0.065	0.475	0.66	0.304	0.071	0.495	0.31	0.098	0.172	0.805
Departure Headway (Hd)	9.819	9.319	8.619	9.415	8.915	8.215	10.034	9.534	9.383	9.729	9.229	8.529
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	368	385	415	383	405	437	357	377	383	368	388	425
Service Time	7.586	7.086	6.386	7.176	6.676	5.976	7.803	7.303	7.152	7.491	6.991	6.291
HCM Lane V/C Ratio	0.742	0.197	0.065	0.473	0.659	0.304	0.073	0.496	0.311	0.098	0.173	0.8
HCM Control Delay	36.4	14.4	12	20.5	27.5	14.6	13.6	21.4	16.3	13.6	13.9	38.4
HCM Lane LOS	E	B	B	C	D	B	B	C	C	B	B	E
HCM 95th-tile Q	5.8	0.7	0.2	2.5	4.6	1.3	0.2	2.6	1.3	0.3	0.6	7.2

Mitigated Existing + Project Phase 1 PM
1: College Avenue & Bush Street

Intersection	
Int Delay, s/veh	4.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	155	3	111	138	3	118
Future Vol, veh/h	155	3	111	138	3	118
Conflicting Peds, #/hr	0	0	0	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	65	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	187	4	171	212	5	182

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	191	0	743	189
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	556	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1383	-	383	853
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1383	-	335	851
Mov Cap-2 Maneuver	-	-	-	-	335	-
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	502	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.6	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	820	-	-	1383	-
HCM Lane V/C Ratio	0.227	-	-	0.123	-
HCM Control Delay (s)	10.7	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.9	-	-	0.4	-

Mitigated Existing + Project Phase 1 PM
2: Semas Drive & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	272	1	67	245	4	34
Future Vol, veh/h	272	1	67	245	4	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	65	65	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	353	1	103	377	6	48

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	354	0	937	354
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	583	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1205	-	294	690
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	558	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1205	-	262	690
Mov Cap-2 Maneuver	-	-	-	-	262	-
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	589	-	-	1205	-
HCM Lane V/C Ratio	0.091	-	-	0.086	-
HCM Control Delay (s)	11.7	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.3	-

Mitigated Existing + Project Phase 1 PM
3: Belle Haven & Bush Street

	↗	→	↙	←	↖	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	10	387	50	364	58	7	36	75	3	20
v/c Ratio	0.06	0.82	0.29	0.33	0.10	0.04	0.06	0.41	0.00	0.02
Control Delay	33.6	42.7	21.2	15.4	0.3	33.2	8.9	40.2	18.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	42.7	21.2	15.4	0.3	33.2	8.9	40.2	18.0	0.1
Queue Length 50th (ft)	5	177	16	16	0	3	0	36	1	0
Queue Length 95th (ft)	16	218	34	32	1	15	22	63	6	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	170	537	170	1220	638	170	629	197	895	864
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.72	0.29	0.30	0.09	0.04	0.06	0.38	0.00	0.02

Intersection Summary

3: Belle Haven & Bush Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑	↱
Traffic Volume (veh/h)	8	295	3	40	291	46	6	1	31	57	2	15
Future Volume (veh/h)	8	295	3	40	291	46	6	1	31	57	2	15
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	10	383	4	50	364	58	7	1	35	75	3	20
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	34	436	5	116	1001	447	326	11	388	354	498	422
Arrive On Green	0.02	0.24	0.24	0.13	0.58	0.58	0.19	0.26	0.26	0.21	0.28	0.28
Sat Flow, veh/h	1725	1789	19	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	10	0	387	50	364	58	7	0	36	75	3	20
Grp Sat Flow(s),veh/h/ln	1725	0	1808	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	0.5	0.0	16.5	2.1	4.5	0.8	0.3	0.0	1.4	2.9	0.1	0.6
Cycle Q Clear(g_c), s	0.5	0.0	16.5	2.1	4.5	0.8	0.3	0.0	1.4	2.9	0.1	0.6
Prop In Lane	1.00		0.01	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	34	0	441	116	1001	447	326	0	399	354	498	422
V/C Ratio(X)	0.29	0.00	0.88	0.43	0.36	0.13	0.02	0.00	0.09	0.21	0.01	0.05
Avail Cap(c_a), veh/h	172	0	542	172	1032	460	326	0	399	354	498	422
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.98	0.98	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.6	0.0	29.1	33.2	12.8	3.7	26.4	0.0	22.5	26.4	21.1	14.2
Incr Delay (d2), s/veh	4.6	0.0	13.1	2.5	0.2	0.1	0.0	0.0	0.4	0.3	0.0	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	0.2	0.0	8.2	0.9	1.5	0.5	0.1	0.0	0.5	1.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.2	0.0	42.2	35.7	13.0	3.8	26.4	0.0	23.0	26.7	21.1	14.4
LnGrp LOS	D	A	D	D	B	A	C	A	C	C	C	B
Approach Vol, veh/h		397			472			43			98	
Approach Delay, s/veh		42.2			14.3			23.5			24.0	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.9	25.2	9.9	24.0	19.6	26.5	6.1	27.8
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	9.3	20.7	8.0	24.0	8.0	22.0	8.0	24.0
Max Q Clear Time (g_c+I1), s	4.9	3.4	4.1	18.5	2.3	2.6	2.5	6.5
Green Ext Time (p_c), s	0.0	0.1	0.0	1.0	0.0	0.0	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Mitigated Existing + Project Phase 1 PM
4: SR 41 SB Ramp & Bush Street

08/24/2019

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	306	155	117	356	120	59
v/c Ratio	0.71	0.32	0.50	0.26	0.14	0.07
Control Delay	13.8	2.2	35.4	14.2	16.2	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	2.2	35.4	14.2	16.2	3.1
Queue Length 50th (ft)	44	0	63	38	33	0
Queue Length 95th (ft)	50	m1	117	51	85	17
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	644	635	333	2084	833	787
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.24	0.35	0.17	0.14	0.07

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	254	129	105	320	0	0	0	0	115	0	57
Future Volume (veh/h)	0	254	129	105	320	0	0	0	0	115	0	57
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	306	155	117	356	0				120	0	59
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	381	315	161	1240	0				922	0	820
Arrive On Green	0.00	0.21	0.21	0.09	0.36	0.00				0.53	0.00	0.53
Sat Flow, veh/h	0	1826	1511	1739	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	306	155	117	356	0				120	0	59
Grp Sat Flow(s),veh/h/ln	0	1826	1511	1739	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	12.7	7.2	5.2	5.9	0.0				2.8	0.0	1.5
Cycle Q Clear(g_c), s	0.0	12.7	7.2	5.2	5.9	0.0				2.8	0.0	1.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	381	315	161	1240	0				922	0	820
V/C Ratio(X)	0.00	0.80	0.49	0.73	0.29	0.00				0.13	0.00	0.07
Avail Cap(c_a), veh/h	0	650	538	337	2103	0				922	0	820
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.57	0.57	0.81	0.81	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	30.1	27.9	35.3	18.4	0.0				9.5	0.0	9.2
Incr Delay (d2), s/veh	0.0	2.3	0.7	5.0	0.1	0.0				0.3	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	5.6	2.6	2.4	2.2	0.0				1.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	32.4	28.6	40.3	18.5	0.0				9.8	0.0	9.3
LnGrp LOS	A	C	C	D	B	A				A	A	A
Approach Vol, veh/h		461			473						179	
Approach Delay, s/veh		31.1			23.9						9.6	
Approach LOS		C			C						A	

Timer - Assigned Phs			3	4		6		8
Phs Duration (G+Y+Rc), s			11.9	21.2		46.9		33.1
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5
Max Green Setting (Gmax), s			15.5	28.5		22.5		48.5
Max Q Clear Time (g_c+I1), s			7.2	14.7		4.8		7.9
Green Ext Time (p_c), s			0.2	1.9		0.7		2.5

Intersection Summary			
HCM 6th Ctrl Delay			24.6
HCM 6th LOS			C

Mitigated Existing + Project Phase 1 PM
5: SR 41 NB Ramp & Bush Street

08/24/2019

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	59	366	417	171	258
v/c Ratio	0.31	0.64	0.55	0.17	0.26
Control Delay	20.8	14.6	26.2	10.9	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	14.6	26.2	10.9	2.6
Queue Length 50th (ft)	19	55	85	39	0
Queue Length 95th (ft)	m51	75	113	93	40
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	249	970	1149	997	1000
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.38	0.36	0.17	0.26

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

Mitigated Existing + Project Phase 1 PM
5: SR 41 NB Ramp & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	51	318	0	0	269	98	156	1	237	0	0	0
Future Volume (veh/h)	51	318	0	0	269	98	156	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	59	366	0	0	306	111	170	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	128	548	0	0	426	151	1028	6	920			
Arrive On Green	0.15	0.60	0.00	0.00	0.17	0.17	0.59	0.59	0.59			
Sat Flow, veh/h	1753	1841	0	0	2621	899	1743	10	1560			
Grp Volume(v), veh/h	59	366	0	0	210	207	171	0	258			
Grp Sat Flow(s),veh/h/ln	1753	1841	0	0	1749	1679	1754	0	1560			
Q Serve(g_s), s	2.5	10.7	0.0	0.0	9.1	9.4	3.5	0.0	6.5			
Cycle Q Clear(g_c), s	2.5	10.7	0.0	0.0	9.1	9.4	3.5	0.0	6.5			
Prop In Lane	1.00		0.00	0.00		0.54	0.99		1.00			
Lane Grp Cap(c), veh/h	128	548	0	0	294	283	1034	0	920			
V/C Ratio(X)	0.46	0.67	0.00	0.00	0.71	0.73	0.17	0.00	0.28			
Avail Cap(c_a), veh/h	252	978	0	0	579	556	1034	0	920			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.64	0.64	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	32.7	13.5	0.0	0.0	31.4	31.6	7.5	0.0	8.1			
Incr Delay (d2), s/veh	1.6	0.9	0.0	0.0	3.2	3.7	0.3	0.0	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			
%ile BackOfQ(50%),veh/ln	1.0	3.1	0.0	0.0	3.9	3.9	1.3	0.0	2.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	14.4	0.0	0.0	34.6	35.2	7.8	0.0	8.8			
LnGrp LOS	C	B	A	A	C	D	A	A	A			
Approach Vol, veh/h		425			417			429				
Approach Delay, s/veh		17.2			34.9			8.4				
Approach LOS		B			C			A				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		51.7		28.3			10.3	18.0				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		28.5		42.5			11.5	26.5				
Max Q Clear Time (g_c+I1), s		8.5		12.7			4.5	11.4				
Green Ext Time (p_c), s		1.8		2.3			0.0	2.1				

Intersection Summary			
HCM 6th Ctrl Delay			20.1
HCM 6th LOS			C

Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	215	222	118	18	161	16	84	57	19	16	42	122
Future Vol, veh/h	215	222	118	18	161	16	84	57	19	16	42	122
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	253	261	139	20	177	18	90	61	20	17	45	130
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.1	11.6	11.9	11.4
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	77%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	23%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	84	57	19	215	222	118	18	107	70	16	42	122
LT Vol	84	0	0	215	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	222	0	0	107	54	0	42	0
RT Vol	0	0	19	0	0	118	0	0	16	0	0	122
Lane Flow Rate	90	61	20	253	261	139	20	118	77	17	45	130
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.198	0.126	0.038	0.482	0.461	0.218	0.042	0.235	0.149	0.037	0.092	0.241
Departure Headway (Hd)	7.907	7.407	6.707	6.861	6.361	5.661	7.666	7.166	7.005	7.895	7.395	6.695
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	452	481	530	524	564	630	464	498	508	451	482	532
Service Time	5.7	5.2	4.5	4.63	4.13	3.43	5.457	4.957	4.796	5.686	5.186	4.486
HCM Lane V/C Ratio	0.199	0.127	0.038	0.483	0.463	0.221	0.043	0.237	0.152	0.038	0.093	0.244
HCM Control Delay	12.7	11.3	9.8	15.9	14.5	10	10.8	12.2	11	11	10.9	11.6
HCM Lane LOS	B	B	A	C	B	A	B	B	B	B	B	B
HCM 95th-tile Q	0.7	0.4	0.1	2.6	2.4	0.8	0.1	0.9	0.5	0.1	0.3	0.9

APPENDIX G

EXISTING (2018) PLUS PROJECT PHASES 1 & 2

CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

1: College Avenue & Bush Street

Intersection	
Int Delay, s/veh	8.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	41	5	283	241	7	224
Future Vol, veh/h	41	5	283	241	7	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	58	58	45	45
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	6	488	416	16	498

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	58	0	1444	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	1392	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1546	-	145	1016
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	230	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	99	1016
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	157	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		4.5		17.5	
HCM LOS					C	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	793	-	-	1546	-
HCM Lane V/C Ratio	0.647	-	-	0.316	-
HCM Control Delay (s)	17.5	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	4.8	-	-	1.4	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	261	4	27	518	6	67
Future Vol, veh/h	261	4	27	518	6	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	53	53	58	58	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	492	8	47	893	11	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	500	0	1483	496
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	987	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1064	-	138	574
Stage 1	-	-	-	-	612	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1064	-	126	574
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	612	-
Stage 2	-	-	-	-	329	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	16.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	444	-	-	1064	-
HCM Lane V/C Ratio	0.299	-	-	0.044	-
HCM Control Delay (s)	16.5	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	74.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	18	302	8	20	497	45	6	0	39	52	0	42
Future Vol, veh/h	18	302	8	20	497	45	6	0	39	52	0	42
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	34	570	15	33	815	74	11	0	68	78	0	63
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	168.6	25.6	13.6	14.3
HCM LOS	F	D	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	5%	7%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	92%	93%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	2%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	39	328	269	253	41	52	0	42
LT Vol	6	0	18	20	0	0	52	0	0
Through Vol	0	0	302	249	248	0	0	0	0
RT Vol	0	39	8	0	5	41	0	0	42
Lane Flow Rate	11	68	619	440	415	66	78	0	63
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.028	0.159	1.29	0.774	0.724	0.103	0.2	0	0.141
Departure Headway (Hd)	10.408	9.152	7.503	6.722	6.671	5.967	10.062	9.541	8.811
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	346	394	483	541	547	604	359	0	409
Service Time	8.108	6.852	5.28	4.422	4.371	3.667	7.762	7.241	6.511
HCM Lane V/C Ratio	0.032	0.173	1.282	0.813	0.759	0.109	0.217	0	0.154
HCM Control Delay	13.4	13.6	168.6	28.8	24.9	9.4	15.3	12.2	13
HCM Lane LOS	B	B	F	D	C	A	C	N	B
HCM 95th-tile Q	0.1	0.6	26	7	6	0.3	0.7	0	0.5

Intersection	
Int Delay, s/veh	28.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	249	144	286	467	0	0	0	0	59	0	95
Future Vol, veh/h	0	249	144	286	467	0	0	0	0	59	0	95
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	429	248	353	577	0	0	0	0	80	0	128

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	677	0	0				1837	1960	290
Stage 1	-	-	-	-	-	-				1283	1283	-
Stage 2	-	-	-	-	-	-				554	677	-
Critical Hdwy	-	-	-	4.16	-	-				6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-				5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-				3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	901	-	0				~ 73	62	702
Stage 1	0	-	-	-	-	0				222	232	-
Stage 2	0	-	-	-	-	0				570	447	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	901	-	-				~ 44	0	701
Mov Cap-2 Maneuver	-	-	-	-	-	-				~ 44	0	-
Stage 1	-	-	-	-	-	-				222	0	-
Stage 2	-	-	-	-	-	-				347	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.4	231.4
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	901	-	44	701
HCM Lane V/C Ratio	-	-	0.392	-	1.812	0.183
HCM Control Delay (s)	-	-	11.5	-	$ 585.9	11.3
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	1.9	-	8.1	0.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	14.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	53	255	0	0	578	158	175	2	82	0	0	0
Future Vol, veh/h	53	255	0	0	578	158	175	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	87	418	0	0	705	193	236	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	898	0	-	-	-	0	945	1490	418
Stage 1	-	-	-	-	-	-	592	592	-
Stage 2	-	-	-	-	-	-	353	898	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	749	-	0	0	-	-	273	122	631
Stage 1	-	-	0	0	-	-	549	491	-
Stage 2	-	-	0	0	-	-	680	355	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	749	-	-	-	-	-	241	0	631
Mov Cap-2 Maneuver	-	-	-	-	-	-	241	0	-
Stage 1	-	-	-	-	-	-	485	0	-
Stage 2	-	-	-	-	-	-	680	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.8	0	72
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	241	631	749	-	-	-
HCM Lane V/C Ratio	0.992	0.176	0.116	-	-	-
HCM Control Delay (s)	99.9	11.9	10.4	-	-	-
HCM Lane LOS	F	B	B	-	-	-
HCM 95th %tile Q(veh)	9.4	0.6	0.4	-	-	-

Intersection	
Intersection Delay, s/veh	28.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	100	162	75	22	244	22	192	53	19	32	59	300
Future Vol, veh/h	100	162	75	22	244	22	192	53	19	32	59	300
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	185	300	139	26	284	26	274	76	27	36	67	341
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	26.2	19.7	32.1	35.3
HCM LOS	D	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	192	53	19	100	162	75	22	163	103	32	59
LT Vol	192	0	0	100	0	0	22	0	0	32	0
Through Vol	0	53	0	0	162	0	0	163	81	0	59
RT Vol	0	0	19	0	0	75	0	0	22	0	0
Lane Flow Rate	274	76	27	185	300	139	26	189	120	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.763	0.2	0.067	0.489	0.751	0.321	0.073	0.511	0.32	0.1	0.176
Departure Headway (Hd)	10.02	9.52	8.82	9.512	9.012	8.312	10.231	9.731	9.582	9.925	9.425
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	362	376	405	378	402	432	350	371	375	361	380
Service Time	7.795	7.295	6.595	7.28	6.78	6.08	8.008	7.508	7.359	7.698	7.198
HCM Lane V/C Ratio	0.757	0.202	0.067	0.489	0.746	0.322	0.074	0.509	0.32	0.1	0.176
HCM Control Delay	38.9	14.7	12.2	21.1	34.5	15	13.8	22.3	16.8	13.8	14.2
HCM Lane LOS	E	B	B	C	D	B	B	C	C	B	B
HCM 95th-tile Q	6.1	0.7	0.2	2.6	6.1	1.4	0.2	2.8	1.4	0.3	0.6

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	156	4	122	139	4	125
Future Vol, veh/h	156	4	122	139	4	125
Conflicting Peds, #/hr	0	0	0	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	65	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	188	5	188	214	6	192

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	193	0	780	190
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	592	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1380	-	364	852
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1380	-	314	850
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	477	-

Approach	EB		WB		NB
HCM Control Delay, s	0		3.7		10.9
HCM LOS					B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	807	-	-	1380	-
HCM Lane V/C Ratio	0.246	-	-	0.136	-
HCM Control Delay (s)	10.9	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1	-	-	0.5	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	278	3	114	254	7	58
Future Vol, veh/h	278	3	114	254	7	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	65	65	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	361	4	175	391	10	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	365	0	1104	363
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	741	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1194	-	234	682
Stage 1	-	-	-	-	704	-
Stage 2	-	-	-	-	471	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1194	-	190	682
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	704	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	13.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	533	-	-	1194	-
HCM Lane V/C Ratio	0.172	-	-	0.147	-
HCM Control Delay (s)	13.2	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.5	-

Intersection	
Intersection Delay, s/veh	17.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑ ↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	9	323	4	40	344	46	7	1	31	57	2	17
Future Vol, veh/h	9	323	4	40	344	46	7	1	31	57	2	17
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	12	419	5	50	430	58	8	1	35	75	3	22
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	26.6	11.8	10.5	11.9
HCM LOS	D	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	3%	19%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	96%	81%	97%	0%	0%	100%	0%
Vol Right, %	0%	97%	1%	0%	3%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	32	336	212	177	41	57	2	17
LT Vol	7	0	9	40	0	0	57	0	0
Through Vol	0	1	323	172	172	0	0	2	0
RT Vol	0	31	4	0	5	41	0	0	17
Lane Flow Rate	8	36	436	265	221	52	75	3	22
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.018	0.071	0.763	0.427	0.348	0.072	0.168	0.006	0.043
Departure Headway (Hd)	8.289	7.081	6.296	5.795	5.681	4.992	8.067	7.557	6.843
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	430	503	576	620	634	716	443	472	521
Service Time	6.069	4.86	4.043	3.535	3.421	2.732	5.837	5.327	4.612
HCM Lane V/C Ratio	0.019	0.072	0.757	0.427	0.349	0.073	0.169	0.006	0.042
HCM Control Delay	11.2	10.4	26.6	12.8	11.4	8.1	12.5	10.4	9.9
HCM Lane LOS	B	B	D	B	B	A	B	B	A
HCM 95th-tile Q	0.1	0.2	6.9	2.1	1.6	0.2	0.6	0	0.1

4: SR 41 SB Ramp & Bush Street

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	273	138	105	362	0	0	0	0	115	0	68
Future Vol, veh/h	0	273	138	105	362	0	0	0	0	115	0	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	329	166	117	402	0	0	0	0	120	0	71

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	495	0	0				1048	1131	201
Stage 1	-	-	-	-	-	-				636	636	-
Stage 2	-	-	-	-	-	-				412	495	-
Critical Hdwy	-	-	-	4.175	-	-				6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-				5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-				3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	1049	-	0				233	199	799
Stage 1	0	-	-	-	-	0				484	465	-
Stage 2	0	-	-	-	-	0				660	539	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1049	-	-				207	0	799
Mov Cap-2 Maneuver	-	-	-	-	-	-				207	0	-
Stage 1	-	-	-	-	-	-				484	0	-
Stage 2	-	-	-	-	-	-				586	0	-

Approach	EB			WB						SB
HCM Control Delay, s	0			2						31.3
HCM LOS										D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1049	-	207	799
HCM Lane V/C Ratio	-	-	0.111	-	0.579	0.089
HCM Control Delay (s)	-	-	8.9	-	43.9	9.9
HCM Lane LOS	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	-	0.4	-	3.2	0.3

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑			↑↱			↰	↗			
Traffic Vol, veh/h	56	332	0	0	288	98	179	1	237	0	0	0
Future Vol, veh/h	56	332	0	0	288	98	179	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	64	382	0	0	327	111	195	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	438	0	-	-	-	0	674	948	382
Stage 1	-	-	-	-	-	-	510	510	-
Stage 2	-	-	-	-	-	-	164	438	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1108	-	0	0	-	-	400	257	659
Stage 1	-	-	0	0	-	-	597	533	-
Stage 2	-	-	0	0	-	-	844	574	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1108	-	-	-	-	-	377	0	659
Mov Cap-2 Maneuver	-	-	-	-	-	-	377	0	-
Stage 1	-	-	-	-	-	-	562	0	-
Stage 2	-	-	-	-	-	-	844	0	-

Approach	EB			WB			NB
HCM Control Delay, s	1.2			0			18.4
HCM LOS							C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	377	659	1108	-	-	-
HCM Lane V/C Ratio	0.519	0.391	0.058	-	-	-
HCM Control Delay (s)	24.4	13.9	8.4	-	-	-
HCM Lane LOS	C	B	A	-	-	-
HCM 95th %tile Q(veh)	2.9	1.9	0.2	-	-	-

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑ ↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	216	234	119	18	175	16	87	57	19	16	42	124
Future Vol, veh/h	216	234	119	18	175	16	87	57	19	16	42	124
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	254	275	140	20	192	18	94	61	20	17	45	132
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.8	12	12.1	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	78%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	22%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	87	57	19	216	234	119	18	117	74	16	42
LT Vol	87	0	0	216	0	0	18	0	0	16	0
Through Vol	0	57	0	0	234	0	0	117	58	0	42
RT Vol	0	0	19	0	0	119	0	0	16	0	0
Lane Flow Rate	94	61	20	254	275	140	20	128	82	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.211	0.13	0.039	0.497	0.5	0.223	0.043	0.261	0.163	0.038	0.094
Departure Headway (Hd)	8.113	7.613	6.913	7.035	6.535	5.735	7.839	7.339	7.188	8.104	7.604
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	443	472	519	516	556	619	458	491	500	443	472
Service Time	5.844	5.344	4.644	4.735	4.235	3.535	5.57	5.07	4.92	5.835	5.335
HCM Lane V/C Ratio	0.212	0.129	0.039	0.492	0.495	0.226	0.044	0.261	0.164	0.038	0.095
HCM Control Delay	13	11.5	9.9	16.5	15.6	10.2	10.9	12.7	11.3	11.2	11.1
HCM Lane LOS	B	B	A	C	C	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.7	2.8	0.8	0.1	1	0.6	0.1	0.3

APPENDIX H

EXISTING (2018) PLUS PROJECT PHASES 1 & 2

CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

CONDITION: EXISTING (2018) + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	569	421			
Highest Approaches - Minor Street	✓		230	129			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

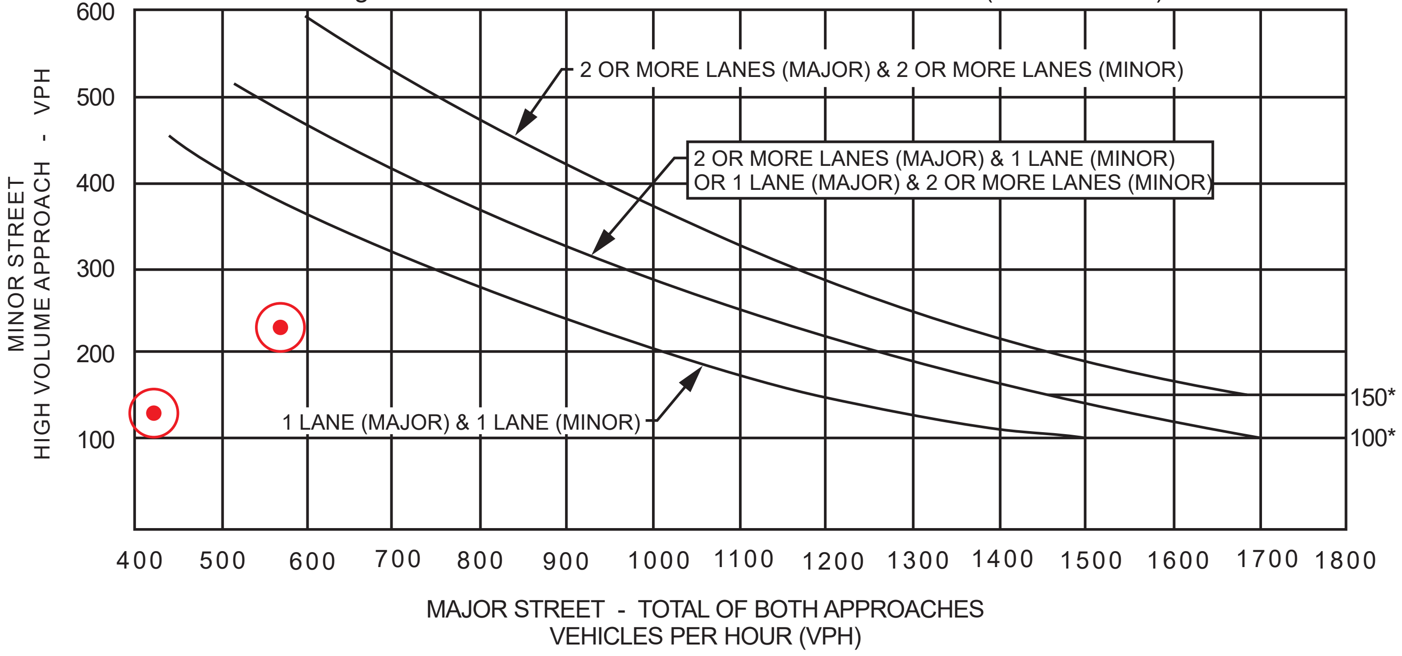


Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)

* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: SEMAS Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

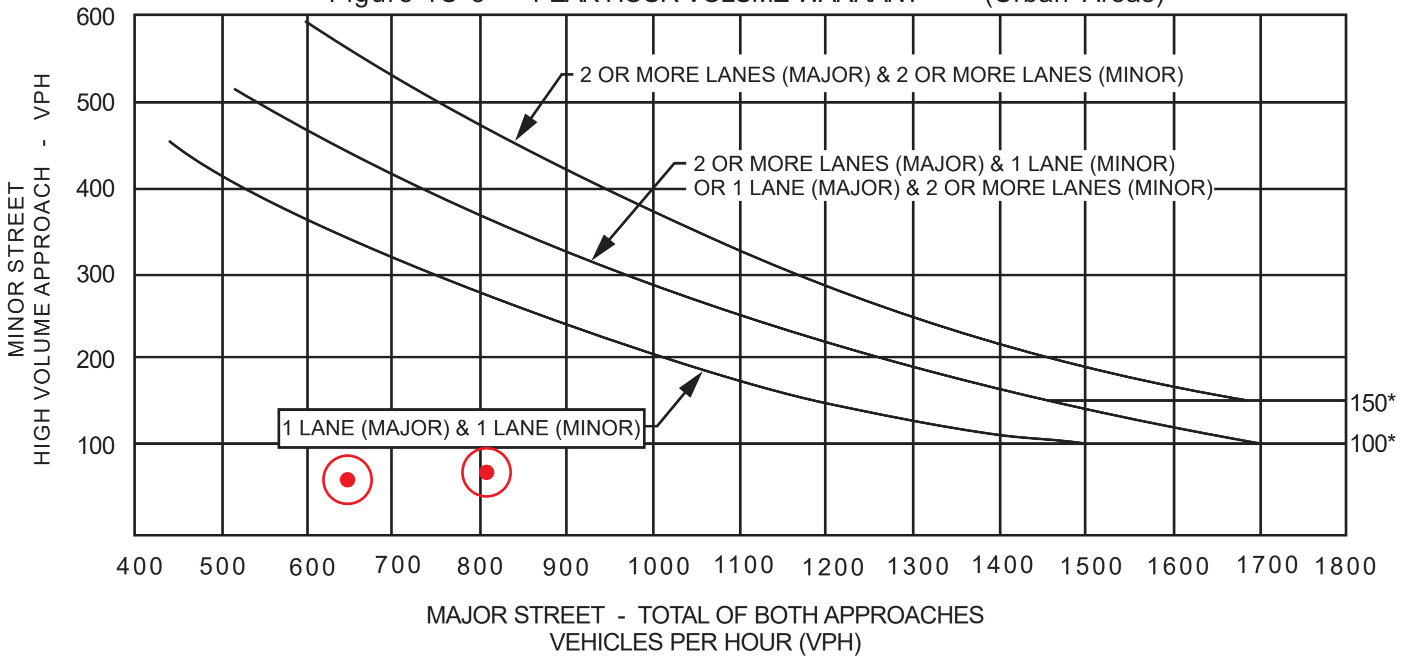
CONDITION: EXISTING (2018) + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street	✓		809	649			
Highest Approaches - Minor Street	✓		73	65			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 40 mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

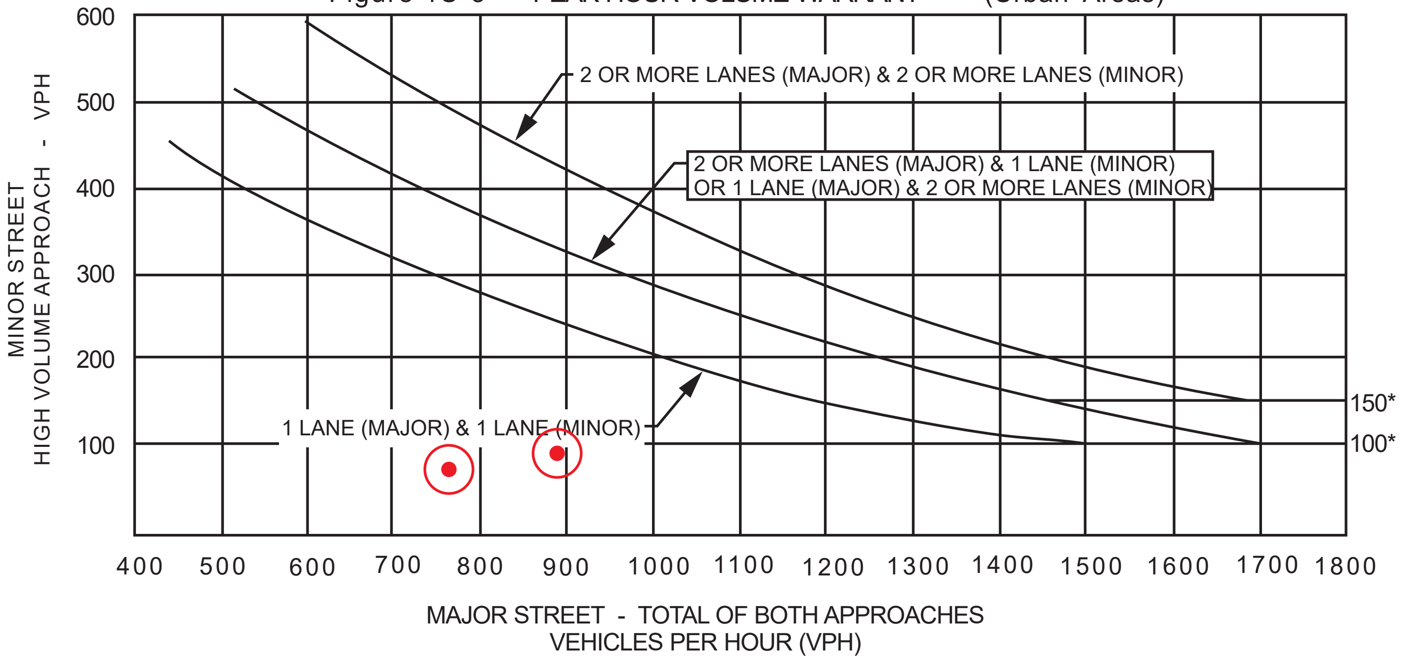
CONDITION: EXISTING (2018) + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	889	766			
Highest Approaches - Minor Street	✓		94	76			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

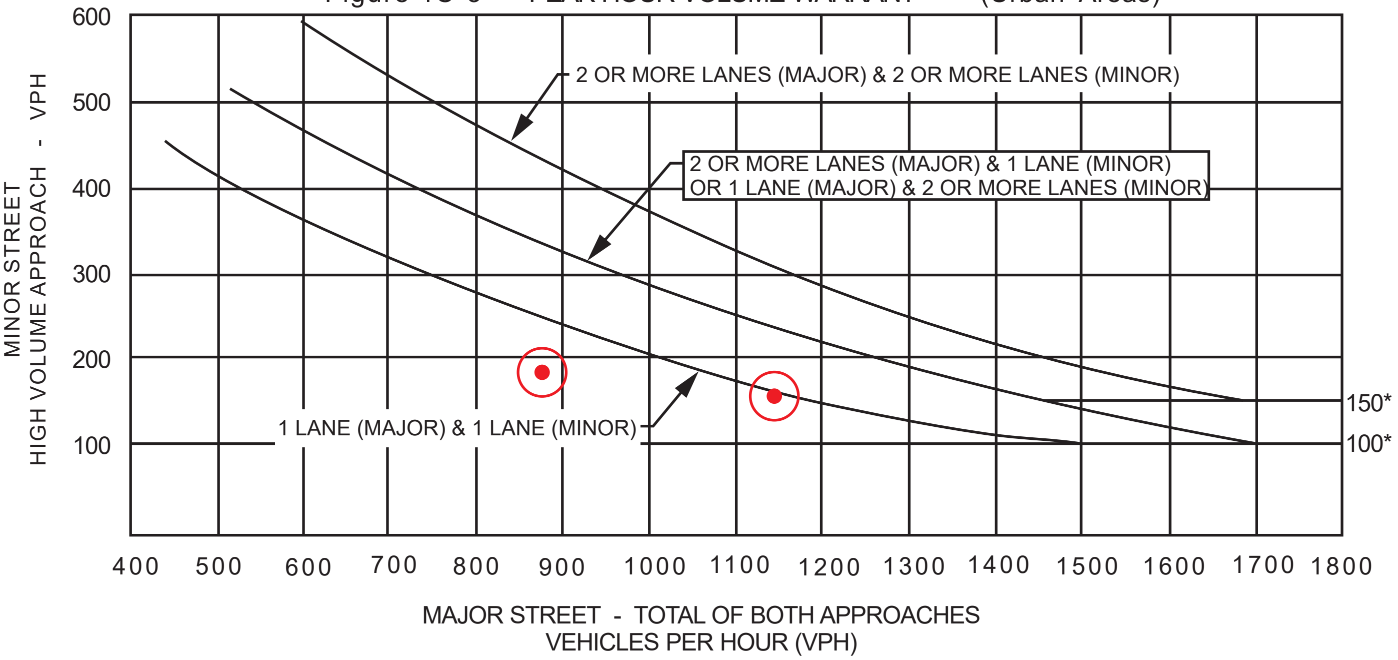
CONDITION: EXISTING (2018) + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1146	877			
Highest Approaches - Minor Street	✓		154	183			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

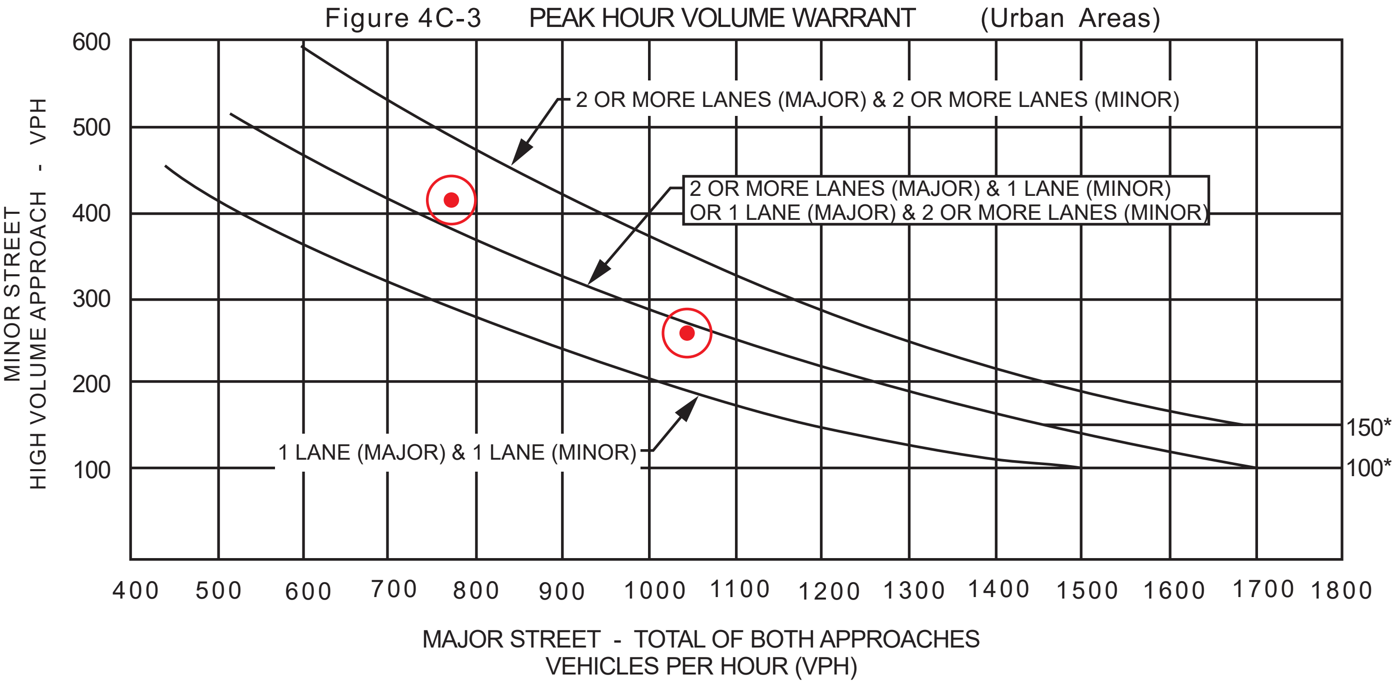
☒ URBAN (U)

CONDITION: EXISTING (2018) + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☒ NO ☐

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1044	774			
Highest Approaches - Minor Street	✓		259	417			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

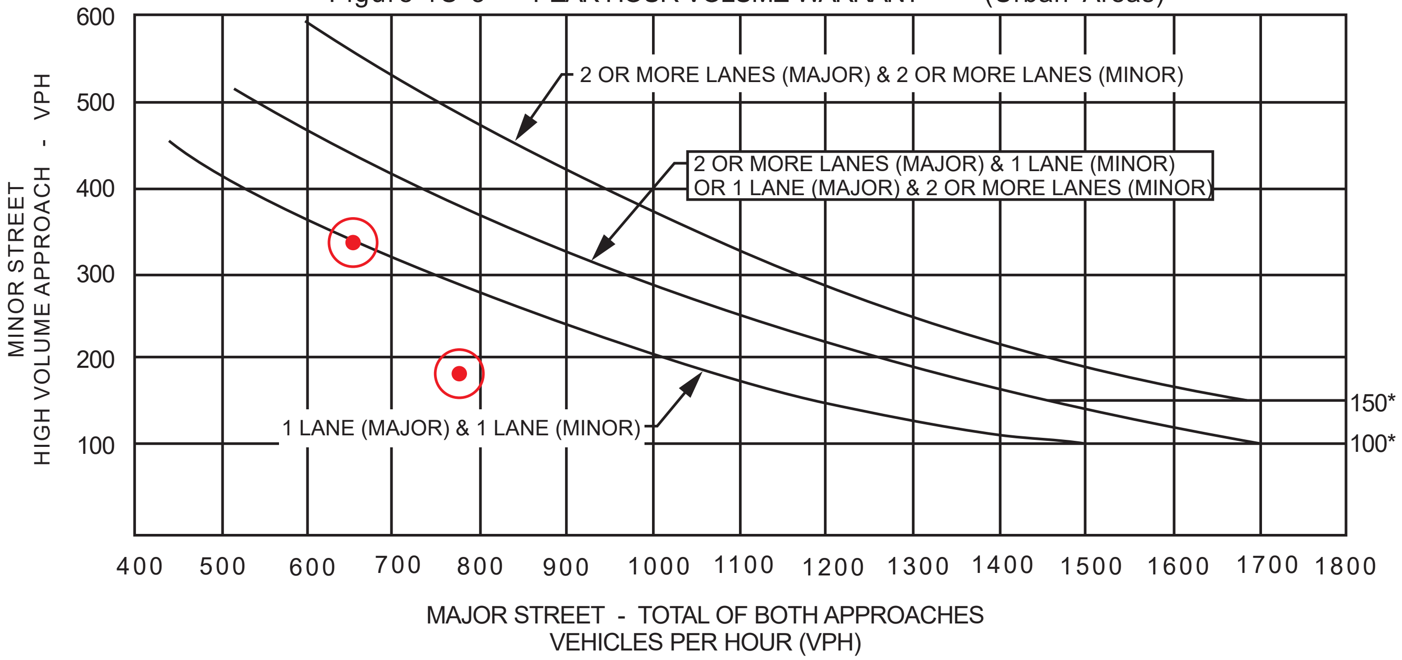
CONDITION: EXISTING (2018) + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	656	779			
Highest Approaches - Minor Street	✓		337	182			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX I

MITIGATED

EXISTING (2018) PLUS PROJECT PHASES 1 & 2

CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

1: College Avenue & Bush Street

Intersection	
Int Delay, s/veh	8.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	41	5	283	241	7	224
Future Vol, veh/h	41	5	283	241	7	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	58	58	45	45
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	6	488	416	16	498

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	58	0	1444	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	1392	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1546	-	145	1016
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	230	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	99	1016
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	157	-

Approach	EB		WB		NB
HCM Control Delay, s	0		4.5		17.5
HCM LOS					C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	793	-	-	1546	-
HCM Lane V/C Ratio	0.647	-	-	0.316	-
HCM Control Delay (s)	17.5	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	4.8	-	-	1.4	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	261	4	27	518	6	67
Future Vol, veh/h	261	4	27	518	6	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	53	53	58	58	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	492	8	47	893	11	122

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	500	0	1483	496
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	987	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1064	-	138	574
Stage 1	-	-	-	-	612	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1064	-	126	574
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	612	-
Stage 2	-	-	-	-	329	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	16.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	444	-	-	1064	-
HCM Lane V/C Ratio	0.299	-	-	0.044	-
HCM Control Delay (s)	16.5	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-

Mitigated Existing + Project Phase 2 AM
3: Belle Haven & Bush Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	34	585	33	815	74	11	68	78	63
v/c Ratio	0.20	0.84	0.19	0.61	0.10	0.06	0.09	0.40	0.07
Control Delay	36.1	38.1	44.0	15.1	0.3	33.7	0.3	39.6	0.2
Queue Delay	0.0	0.2	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	38.3	44.0	15.4	0.3	33.7	0.3	39.6	0.2
Queue Length 50th (ft)	16	230	18	93	0	5	0	37	0
Queue Length 95th (ft)	25	206	30	90	0	13	0	57	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	173	697	173	1328	705	173	726	199	886
Starvation Cap Reductn	0	0	0	140	0	0	0	0	0
Spillback Cap Reductn	0	5	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.85	0.19	0.69	0.10	0.06	0.09	0.39	0.07

Intersection Summary

Mitigated Existing + Project Phase 2 AM
3: Belle Haven & Bush Street

08/24/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	18	302	8	20	497	45	6	0	39	52	0	42
Future Volume (veh/h)	18	302	8	20	497	45	6	0	39	52	0	42
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	34	570	15	33	815	74	11	0	68	78	0	63
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	93	547	14	91	1067	464	38	0	396	286	727	616
Arrive On Green	0.05	0.31	0.31	0.10	0.61	0.61	0.02	0.00	0.25	0.16	0.00	0.40
Sat Flow, veh/h	1753	1785	47	1753	3497	1521	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	34	0	585	33	815	74	11	0	68	78	0	63
Grp Sat Flow(s),veh/h/ln	1753	0	1832	1753	1749	1521	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	1.5	0.0	24.5	1.4	13.6	1.0	0.5	0.0	2.7	3.1	0.0	2.0
Cycle Q Clear(g_c), s	1.5	0.0	24.5	1.4	13.6	1.0	0.5	0.0	2.7	3.1	0.0	2.0
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	93	0	561	91	1067	464	38	0	396	286	727	616
V/C Ratio(X)	0.37	0.00	1.04	0.36	0.76	0.16	0.29	0.00	0.17	0.27	0.00	0.10
Avail Cap(c_a), veh/h	175	0	561	175	1071	466	175	0	396	286	727	616
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.6	0.0	27.8	34.6	13.5	4.1	38.5	0.0	23.3	29.3	0.0	15.3
Incr Delay (d2), s/veh	2.4	0.0	49.5	2.3	3.2	0.2	4.1	0.0	0.9	0.5	0.0	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	0.7	0.0	17.5	0.6	3.7	0.5	0.2	0.0	1.0	1.3	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.0	0.0	77.3	36.9	16.7	4.2	42.6	0.0	24.2	29.8	0.0	15.6
LnGrp LOS	D	A	F	D	B	A	D	A	C	C	A	B
Approach Vol, veh/h		619			922			79			141	
Approach Delay, s/veh		75.2			16.4			26.8			23.5	
Approach LOS		E			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	24.8	8.7	29.0	6.2	36.1	8.7	28.9
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	9.2	20.3	8.0	24.5	8.0	21.5	8.0	24.5
Max Q Clear Time (g_c+I1), s	5.1	4.7	3.4	26.5	2.5	4.0	3.5	15.6
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	3.7

Intersection Summary	
HCM 6th Ctrl Delay	38.1
HCM 6th LOS	D

4: SR 41 SB Ramp & Bush Street

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	429	248	353	577	80	128
v/c Ratio	0.82	0.40	0.82	0.28	0.16	0.23
Control Delay	24.5	2.9	42.2	4.4	24.9	6.4
Queue Delay	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	2.9	42.2	4.4	24.9	6.4
Queue Length 50th (ft)	125	0	159	13	31	0
Queue Length 95th (ft)	79	1	232	42	55	24
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	582	663	488	2277	514	545
Starvation Cap Reductn	12	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.37	0.72	0.25	0.16	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	249	144	286	467	0	0	0	0	59	0	95
Future Volume (veh/h)	0	249	144	286	467	0	0	0	0	59	0	95
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	429	248	353	577	0				80	0	128
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	496	420	397	1930	0				589	0	523
Arrive On Green	0.00	0.27	0.27	0.23	0.55	0.00				0.34	0.00	0.34
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1559
Grp Volume(v), veh/h	0	429	248	353	577	0				80	0	128
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1559
Q Serve(g_s), s	0.0	17.8	11.1	15.6	7.1	0.0				2.5	0.0	4.8
Cycle Q Clear(g_c), s	0.0	17.8	11.1	15.6	7.1	0.0				2.5	0.0	4.8
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	496	420	397	1930	0				589	0	523
V/C Ratio(X)	0.00	0.87	0.59	0.89	0.30	0.00				0.14	0.00	0.24
Avail Cap(c_a), veh/h	0	587	497	493	2295	0				589	0	523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.52	0.52	0.56	0.56	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	27.9	25.4	30.0	9.6	0.0				18.5	0.0	19.2
Incr Delay (d2), s/veh	0.0	6.4	0.7	9.5	0.0	0.0				0.5	0.0	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	0.0	8.2	4.0	7.3	2.4	0.0				1.1	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	34.2	26.1	39.5	9.7	0.0				19.0	0.0	20.3
LnGrp LOS	A	C	C	D	A	A				B	A	C
Approach Vol, veh/h		677			930						208	
Approach Delay, s/veh		31.3			21.0						19.8	
Approach LOS		C			C						B	

Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			22.6	26.0		31.4		48.6				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			22.5	25.5		18.5		52.5				
Max Q Clear Time (g_c+I1), s			17.6	19.8		6.8		9.1				
Green Ext Time (p_c), s			0.5	1.8		0.6		4.3				

Intersection Summary		
HCM 6th Ctrl Delay		24.7
HCM 6th LOS		C

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	87	418	898	239	111
v/c Ratio	0.43	0.47	0.76	0.33	0.16
Control Delay	20.5	10.5	26.6	20.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	10.5	26.6	20.9	5.1
Queue Length 50th (ft)	19	16	193	86	0
Queue Length 95th (ft)	36	25	210	126	20
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	230	1072	1360	717	705
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.38	0.39	0.66	0.33	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	53	255	0	0	578	158	175	2	82	0	0	0
Future Volume (veh/h)	53	255	0	0	578	158	175	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	87	418	0	0	705	193	236	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	151	849	0	0	859	235	751	10	676			
Arrive On Green	0.17	0.91	0.00	0.00	0.32	0.32	0.43	0.43	0.43			
Sat Flow, veh/h	1767	1856	0	0	2813	745	1746	22	1572			
Grp Volume(v), veh/h	87	418	0	0	457	441	239	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1703	1768	0	1572			
Q Serve(g_s), s	3.6	2.8	0.0	0.0	19.1	19.2	7.1	0.0	3.5			
Cycle Q Clear(g_c), s	3.6	2.8	0.0	0.0	19.1	19.2	7.1	0.0	3.5			
Prop In Lane	1.00		0.00	0.00		0.44	0.99		1.00			
Lane Grp Cap(c), veh/h	151	849	0	0	556	537	760	0	676			
V/C Ratio(X)	0.58	0.49	0.00	0.00	0.82	0.82	0.31	0.00	0.16			
Avail Cap(c_a), veh/h	232	1079	0	0	694	670	760	0	676			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.46	0.46	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.8	2.0	0.0	0.0	25.3	25.3	15.0	0.0	14.0			
Incr Delay (d2), s/veh	1.6	0.2	0.0	0.0	6.4	6.6	1.1	0.0	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			
%ile BackOfQ(50%),veh/ln	1.5	0.7	0.0	0.0	8.4	8.2	2.9	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	2.2	0.0	0.0	31.6	31.9	16.1	0.0	14.5			
LnGrp LOS	C	A	A	A	C	C	B	A	B			
Approach Vol, veh/h		505			898			350				
Approach Delay, s/veh		7.6			31.8			15.6				
Approach LOS		A			C			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		38.9		41.1			11.3	29.8				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		24.5		46.5			10.5	31.5				
Max Q Clear Time (g_c+I1), s		9.1		4.8			5.6	21.2				
Green Ext Time (p_c), s		1.6		2.8			0.1	4.1				
Intersection Summary												
HCM 6th Ctrl Delay			21.6									
HCM 6th LOS			C									

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	28.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	100	162	75	22	244	22	192	53	19	32	59	300
Future Vol, veh/h	100	162	75	22	244	22	192	53	19	32	59	300
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	185	300	139	26	284	26	274	76	27	36	67	341
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	26.2	19.7	32.1	35.3
HCM LOS	D	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	192	53	19	100	162	75	22	163	103	32	59	300
LT Vol	192	0	0	100	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	162	0	0	163	81	0	59	0
RT Vol	0	0	19	0	0	75	0	0	22	0	0	300
Lane Flow Rate	274	76	27	185	300	139	26	189	120	36	67	341
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.763	0.2	0.067	0.489	0.751	0.321	0.073	0.511	0.32	0.1	0.176	0.826
Departure Headway (Hd)	10.02	9.52	8.82	9.512	9.012	8.312	10.231	9.731	9.582	9.925	9.425	8.725
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	362	376	405	378	402	432	350	371	375	361	380	416
Service Time	7.795	7.295	6.595	7.28	6.78	6.08	8.008	7.508	7.359	7.698	7.198	6.498
HCM Lane V/C Ratio	0.757	0.202	0.067	0.489	0.746	0.322	0.074	0.509	0.32	0.1	0.176	0.82
HCM Control Delay	38.9	14.7	12.2	21.1	34.5	15	13.8	22.3	16.8	13.8	14.2	41.7
HCM Lane LOS	E	B	B	C	D	B	B	C	C	B	B	E
HCM 95th-tile Q	6.1	0.7	0.2	2.6	6.1	1.4	0.2	2.8	1.4	0.3	0.6	7.7

Mitigated Existing + Project Phase 2 PM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	Y	
Traffic Vol, veh/h	156	4	122	139	4	125
Future Vol, veh/h	156	4	122	139	4	125
Conflicting Peds, #/hr	0	0	0	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	65	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	188	5	188	214	6	192

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	193	0	780	190
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	592	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1380	-	364	852
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	553	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1380	-	314	850
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	477	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	807	-	-	1380	-
HCM Lane V/C Ratio	0.246	-	-	0.136	-
HCM Control Delay (s)	10.9	-	-	8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1	-	-	0.5	-

2: Semas Drive & Bush Street

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	278	3	114	254	7	58
Future Vol, veh/h	278	3	114	254	7	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	65	65	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	361	4	175	391	10	82

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	365	0	1104	363
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	741	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1194	-	234	682
Stage 1	-	-	-	-	704	-
Stage 2	-	-	-	-	471	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1194	-	190	682
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	704	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	13.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	533	-	-	1194	-
HCM Lane V/C Ratio	0.172	-	-	0.147	-
HCM Control Delay (s)	13.2	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.5	-

3: Belle Haven & Bush Street

	↗	→	↙	←	↖	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	12	424	50	430	58	8	36	75	3	22
v/c Ratio	0.07	0.85	0.29	0.37	0.09	0.05	0.06	0.41	0.00	0.03
Control Delay	33.8	45.0	22.1	16.2	0.3	33.4	8.9	40.2	18.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	45.0	22.1	16.2	0.3	33.4	8.9	40.2	18.0	0.1
Queue Length 50th (ft)	6	191	16	18	0	4	0	36	1	0
Queue Length 95th (ft)	18	241	35	40	1	16	22	63	6	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	170	539	170	1237	645	170	608	197	869	845
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.79	0.29	0.35	0.09	0.05	0.06	0.38	0.00	0.03

Intersection Summary

Mitigated Existing + Project Phase 2 PM
3: Belle Haven & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	9	323	4	40	344	46	7	1	31	57	2	17
Future Volume (veh/h)	9	323	4	40	344	46	7	1	31	57	2	17
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	12	419	5	50	430	58	8	1	35	75	3	22
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	40	468	6	116	1052	469	295	11	388	323	498	422
Arrive On Green	0.02	0.26	0.26	0.13	0.61	0.61	0.17	0.26	0.26	0.19	0.28	0.28
Sat Flow, veh/h	1725	1786	21	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	12	0	424	50	430	58	8	0	36	75	3	22
Grp Sat Flow(s),veh/h/ln	1725	0	1807	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	0.5	0.0	18.1	2.1	5.2	0.7	0.3	0.0	1.4	3.0	0.1	0.7
Cycle Q Clear(g_c), s	0.5	0.0	18.1	2.1	5.2	0.7	0.3	0.0	1.4	3.0	0.1	0.7
Prop In Lane	1.00		0.01	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	40	0	474	116	1052	469	295	0	399	323	498	422
V/C Ratio(X)	0.30	0.00	0.89	0.43	0.41	0.12	0.03	0.00	0.09	0.23	0.01	0.05
Avail Cap(c_a), veh/h	172	0	542	172	1052	469	295	0	399	323	498	422
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.98	0.98	0.98	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	0.0	28.5	33.2	11.8	3.6	27.6	0.0	22.5	27.6	21.1	14.1
Incr Delay (d2), s/veh	4.0	0.0	15.9	2.5	0.2	0.1	0.0	0.0	0.4	0.4	0.0	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	0.3	0.0	9.3	0.9	1.6	0.4	0.1	0.0	0.5	1.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	0.0	44.4	35.7	12.0	3.7	27.7	0.0	23.0	28.0	21.1	14.3
LnGrp LOS	D	A	D	D	B	A	C	A	C	C	C	B
Approach Vol, veh/h		436			538			44			100	
Approach Delay, s/veh		44.3			13.3			23.8			24.8	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.5	25.2	9.9	25.5	18.2	26.5	6.4	29.0
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	9.3	20.7	8.0	24.0	8.0	22.0	8.0	24.0
Max Q Clear Time (g_c+I1), s	5.0	3.4	4.1	20.1	2.3	2.7	2.5	7.2
Green Ext Time (p_c), s	0.0	0.1	0.0	0.9	0.0	0.0	0.0	2.7

Intersection Summary	
HCM 6th Ctrl Delay	26.9
HCM 6th LOS	C

4: SR 41 SB Ramp & Bush Street

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	329	166	117	402	120	71
v/c Ratio	0.72	0.33	0.50	0.28	0.15	0.09
Control Delay	13.7	2.0	35.1	13.9	17.0	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	2.0	35.1	13.9	17.0	4.6
Queue Length 50th (ft)	50	1	62	43	34	0
Queue Length 95th (ft)	m46	m1	117	57	87	24
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	667	659	333	2127	810	768
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.25	0.35	0.19	0.15	0.09

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Mitigated Existing + Project Phase 2 PM
4: SR 41 SB Ramp & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	273	138	105	362	0	0	0	0	115	0	68
Future Volume (veh/h)	0	273	138	105	362	0	0	0	0	115	0	68
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	329	166	117	402	0				120	0	71
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	406	336	161	1287	0				898	0	799
Arrive On Green	0.00	0.22	0.22	0.09	0.37	0.00				0.52	0.00	0.52
Sat Flow, veh/h	0	1826	1511	1739	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	329	166	117	402	0				120	0	71
Grp Sat Flow(s),veh/h/ln	0	1826	1511	1739	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	13.7	7.7	5.2	6.6	0.0				2.9	0.0	1.9
Cycle Q Clear(g_c), s	0.0	13.7	7.7	5.2	6.6	0.0				2.9	0.0	1.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	406	336	161	1287	0				898	0	799
V/C Ratio(X)	0.00	0.81	0.49	0.73	0.31	0.00				0.13	0.00	0.09
Avail Cap(c_a), veh/h	0	673	557	337	2147	0				898	0	799
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.52	0.52	0.76	0.76	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	29.5	27.2	35.3	17.9	0.0				10.0	0.0	9.8
Incr Delay (d2), s/veh	0.0	2.1	0.6	4.7	0.1	0.0				0.3	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	5.9	2.7	2.3	2.5	0.0				1.1	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	31.6	27.8	40.0	18.0	0.0				10.4	0.0	10.0
LnGrp LOS	A	C	C	D	B	A				B	A	B
Approach Vol, veh/h		495			519						191	
Approach Delay, s/veh		30.3			23.0						10.2	
Approach LOS		C			C						B	

Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			11.9	22.3		45.8		34.2				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			15.5	29.5		21.5		49.5				
Max Q Clear Time (g_c+I1), s			7.2	15.7		4.9		8.6				
Green Ext Time (p_c), s			0.2	2.1		0.8		2.8				

Intersection Summary			
HCM 6th Ctrl Delay			24.0
HCM 6th LOS			C

Mitigated Existing + Project Phase 2 PM
5: SR 41 NB Ramp & Bush Street

	↗	→	←	↑	↱
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	64	382	438	196	258
v/c Ratio	0.33	0.62	0.61	0.21	0.27
Control Delay	20.8	11.0	28.4	11.9	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	11.0	28.4	11.9	2.7
Queue Length 50th (ft)	22	54	92	46	0
Queue Length 95th (ft)	m53	74	122	107	41
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	249	970	1147	956	969
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.39	0.38	0.21	0.27

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	56	332	0	0	288	98	179	1	237	0	0	0
Future Volume (veh/h)	56	332	0	0	288	98	179	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	64	382	0	0	327	111	195	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	133	565	0	0	450	150	1013	5	906			
Arrive On Green	0.15	0.61	0.00	0.00	0.17	0.17	0.58	0.58	0.58			
Sat Flow, veh/h	1753	1841	0	0	2668	859	1745	9	1560			
Grp Volume(v), veh/h	64	382	0	0	220	218	196	0	258			
Grp Sat Flow(s),veh/h/ln	1753	1841	0	0	1749	1686	1753	0	1560			
Q Serve(g_s), s	2.7	11.0	0.0	0.0	9.5	9.8	4.2	0.0	6.6			
Cycle Q Clear(g_c), s	2.7	11.0	0.0	0.0	9.5	9.8	4.2	0.0	6.6			
Prop In Lane	1.00		0.00	0.00		0.51	0.99		1.00			
Lane Grp Cap(c), veh/h	133	565	0	0	306	295	1018	0	906			
V/C Ratio(X)	0.48	0.68	0.00	0.00	0.72	0.74	0.19	0.00	0.28			
Avail Cap(c_a), veh/h	252	978	0	0	579	559	1018	0	906			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.63	0.63	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	32.5	12.8	0.0	0.0	31.2	31.3	7.9	0.0	8.4			
Incr Delay (d2), s/veh	1.7	0.9	0.0	0.0	3.2	3.6	0.4	0.0	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			
%ile BackOfQ(50%),veh/ln	1.1	3.1	0.0	0.0	4.1	4.1	1.5	0.0	2.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.2	13.7	0.0	0.0	34.4	34.9	8.3	0.0	9.2			
LnGrp LOS	C	B	A	A	C	C	A	A	A			
Approach Vol, veh/h		446			438			454				
Approach Delay, s/veh		16.7			34.6			8.8				
Approach LOS		B			C			A				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		50.9		29.1			10.6	18.5				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		28.5		42.5			11.5	26.5				
Max Q Clear Time (g_c+I1), s		8.6		13.0			4.7	11.8				
Green Ext Time (p_c), s		2.0		2.4			0.1	2.2				

Intersection Summary			
HCM 6th Ctrl Delay			19.9
HCM 6th LOS			B

Mitigated Existing + Project Phase 2 PM
6: 19 1/2 Avenue & Bush Street

08/24/2019

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	216	234	119	18	175	16	87	57	19	16	42	124
Future Vol, veh/h	216	234	119	18	175	16	87	57	19	16	42	124
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	254	275	140	20	192	18	94	61	20	17	45	132
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.8	12	12.1	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	78%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	22%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	87	57	19	216	234	119	18	117	74	16	42	124
LT Vol	87	0	0	216	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	234	0	0	117	58	0	42	0
RT Vol	0	0	19	0	0	119	0	0	16	0	0	124
Lane Flow Rate	94	61	20	254	275	140	20	128	82	17	45	132
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.211	0.13	0.039	0.497	0.5	0.223	0.043	0.261	0.163	0.038	0.094	0.253
Departure Headway (Hd)	8.113	7.613	6.913	7.035	6.535	5.735	7.839	7.339	7.188	8.104	7.604	6.904
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	443	472	519	516	556	619	458	491	500	443	472	521
Service Time	5.844	5.344	4.644	4.735	4.235	3.535	5.57	5.07	4.92	5.835	5.335	4.635
HCM Lane V/C Ratio	0.212	0.129	0.039	0.492	0.495	0.226	0.044	0.261	0.164	0.038	0.095	0.253
HCM Control Delay	13	11.5	9.9	16.5	15.6	10.2	10.9	12.7	11.3	11.2	11.1	12
HCM Lane LOS	B	B	A	C	C	B	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.7	2.8	0.8	0.1	1	0.6	0.1	0.3	1

APPENDIX J

EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3

CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Existing + Project Phase 3 AM

1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	9.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	41	5	289	241	7	246
Future Vol, veh/h	41	5	289	241	7	246
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	58	58	45	45
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	6	498	416	16	547

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	58	0	1464	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	1412	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1546	-	141	1016
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	225	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	96	1016
Mov Cap-2 Maneuver	-	-	-	-	96	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	153	-

Approach	EB		WB		NB
HCM Control Delay, s	0		4.6		19.2
HCM LOS					C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	803	-	-	1546	-
HCM Lane V/C Ratio	0.7	-	-	0.322	-
HCM Control Delay (s)	19.2	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	5.9	-	-	1.4	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	282	5	38	522	8	93
Future Vol, veh/h	282	5	38	522	8	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	53	53	58	58	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	532	9	66	900	15	169

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	541	0	1569	537
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	1032	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1028	-	122	544
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	344	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1028	-	106	544
Mov Cap-2 Maneuver	-	-	-	-	106	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	300	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		20.7	
HCM LOS					C	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	410	-	-	1028	-
HCM Lane V/C Ratio	0.448	-	-	0.064	-
HCM Control Delay (s)	20.7	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.3	-	-	0.2	-

3: Belle Haven & Bush Street

Intersection	
Intersection Delay, s/veh	110
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑ ↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	19	346	10	20	512	45	6	0	39	52	0	42
Future Vol, veh/h	19	346	10	20	512	45	6	0	39	52	0	42
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	36	653	19	33	839	74	11	0	68	78	0	63
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	249.4	27.9	14.1	14.7
HCM LOS	F	D	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	5%	7%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	92%	93%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	3%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	39	375	276	261	41	52	0	42
LT Vol	6	0	19	20	0	0	52	0	0
Through Vol	0	0	346	256	256	0	0	0	0
RT Vol	0	39	10	0	5	41	0	0	42
Lane Flow Rate	11	68	708	452	427	66	78	0	63
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.028	0.16	1.484	0.796	0.746	0.103	0.201	0	0.142
Departure Headway (Hd)	10.813	9.551	7.549	6.906	6.857	6.151	10.445	9.921	9.188
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	333	378	481	529	530	586	346	0	393
Service Time	8.513	7.251	5.323	4.606	4.557	3.851	8.145	7.621	6.888
HCM Lane V/C Ratio	0.033	0.18	1.472	0.854	0.806	0.113	0.225	0	0.16
HCM Control Delay	13.8	14.1	249.4	31.4	27	9.6	15.8	12.6	13.4
HCM Lane LOS	B	B	F	D	D	A	C	N	B
HCM 95th-tile Q	0.1	0.6	35.9	7.5	6.4	0.3	0.7	0	0.5

Intersection	
Int Delay, s/veh	33.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	280	157	286	480	0	0	0	0	59	0	97
Future Vol, veh/h	0	280	157	286	480	0	0	0	0	59	0	97
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	483	271	353	593	0	0	0	0	80	0	131

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	754	0	0	1919	2053	298
Stage 1	-	-	-	-	-	-	1299	1299	-
Stage 2	-	-	-	-	-	-	620	754	-
Critical Hdwy	-	-	-	4.16	-	-	6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	843	-	0	~ 65	54	694
Stage 1	0	-	-	-	-	0	217	228	-
Stage 2	0	-	-	-	-	0	531	412	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	843	-	-	~ 38	0	693
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 38	0	-
Stage 1	-	-	-	-	-	-	217	0	-
Stage 2	-	-	-	-	-	-	309	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.6	285
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	843	-	38	693
HCM Lane V/C Ratio	-	-	0.419	-	2.098	0.189
HCM Control Delay (s)	-	-	12.3	-	$ 734.8	11.4
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	2.1	-	8.7	0.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Existing + Project Phase 3 AM
5: SR 41 NB Ramp & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	21.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	61	278	0	0	586	158	180	2	82	0	0	0
Future Vol, veh/h	61	278	0	0	586	158	180	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	100	456	0	0	715	193	243	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	908	0	-	-	-	0	1014	1564	456
Stage 1	-	-	-	-	-	-	656	656	-
Stage 2	-	-	-	-	-	-	358	908	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	742	-	0	0	-	-	248	110	601
Stage 1	-	-	0	0	-	-	513	459	-
Stage 2	-	-	0	0	-	-	676	351	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	742	-	-	-	-	-	~ 215	0	601
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 215	0	-
Stage 1	-	-	-	-	-	-	444	0	-
Stage 2	-	-	-	-	-	-	676	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.9	0	109
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	215	601	742	-	-	-
HCM Lane V/C Ratio	1.144	0.184	0.135	-	-	-
HCM Control Delay (s)	152.5	12.3	10.6	-	-	-
HCM Lane LOS	F	B	B	-	-	-
HCM 95th %tile Q(veh)	11.7	0.7	0.5	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Intersection Delay, s/veh	32.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	101	180	79	22	250	22	193	53	19	32	59	301
Future Vol, veh/h	101	180	79	22	250	22	193	53	19	32	59	301
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	187	333	146	26	291	26	276	76	27	36	67	342
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	32.4	20.7	34.5	38.4
HCM LOS	D	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	193	53	19	101	180	79	22	167	105	32	59
LT Vol	193	0	0	101	0	0	22	0	0	32	0
Through Vol	0	53	0	0	180	0	0	167	83	0	59
RT Vol	0	0	19	0	0	79	0	0	22	0	0
Lane Flow Rate	276	76	27	187	333	146	26	194	122	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.785	0.205	0.068	0.5	0.846	0.343	0.074	0.535	0.333	0.102	0.18
Departure Headway (Hd)	10.244	9.744	9.044	9.632	9.132	8.432	10.439	9.939	9.792	10.146	9.646
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	353	367	395	374	397	426	342	362	366	353	371
Service Time	8.027	7.527	6.827	7.405	6.905	6.205	8.226	7.726	7.58	7.926	7.426
HCM Lane V/C Ratio	0.782	0.207	0.068	0.5	0.839	0.343	0.076	0.536	0.333	0.102	0.181
HCM Control Delay	42	15	12.5	21.7	45.8	15.6	14.1	23.7	17.4	14.1	14.5
HCM Lane LOS	E	B	B	C	E	C	B	C	C	B	B
HCM 95th-tile Q	6.5	0.8	0.2	2.7	8	1.5	0.2	3	1.4	0.3	0.6

Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	156	4	144	139	4	131
Future Vol, veh/h	156	4	144	139	4	131
Conflicting Peds, #/hr	0	0	0	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	65	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	188	5	222	214	6	202

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	193	0	848	190
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	660	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1380	-	332	852
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	514	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1380	-	278	850
Mov Cap-2 Maneuver	-	-	-	-	278	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	801	-	-	1380	-
HCM Lane V/C Ratio	0.259	-	-	0.161	-
HCM Control Delay (s)	11.1	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1	-	-	0.6	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	283	4	160	274	9	81
Future Vol, veh/h	283	4	160	274	9	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	65	65	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	368	5	246	422	13	114

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	373	0	1285	371
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	914	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1185	-	182	675
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	391	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1185	-	133	675
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	285	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.3	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	480	-	-	1185	-
HCM Lane V/C Ratio	0.264	-	-	0.208	-
HCM Control Delay (s)	15.2	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.8	-

Intersection	
Intersection Delay, s/veh	21.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	10	349	5	40	408	46	8	1	31	57	2	18
Future Vol, veh/h	10	349	5	40	408	46	8	1	31	57	2	18
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	13	453	6	50	510	58	9	1	35	75	3	24
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	36.1	13.2	11	12.3
HCM LOS	E	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	3%	16%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	96%	84%	98%	0%	0%	100%	0%
Vol Right, %	0%	97%	1%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	32	364	244	209	41	57	2	18
LT Vol	8	0	10	40	0	0	57	0	0
Through Vol	0	1	349	204	204	0	0	2	0
RT Vol	0	31	5	0	5	41	0	0	18
Lane Flow Rate	9	36	473	305	261	52	75	3	24
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.022	0.074	0.852	0.499	0.419	0.073	0.175	0.006	0.047
Departure Headway (Hd)	8.638	7.426	6.485	5.885	5.786	5.094	8.402	7.89	7.174
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	412	479	558	610	621	701	425	451	496
Service Time	6.437	5.223	4.241	3.633	3.535	2.842	6.191	5.679	4.962
HCM Lane V/C Ratio	0.022	0.075	0.848	0.5	0.42	0.074	0.176	0.007	0.048
HCM Control Delay	11.6	10.8	36.1	14.4	12.7	8.2	13	10.7	10.3
HCM Lane LOS	B	B	E	B	B	A	B	B	B
HCM 95th-tile Q	0.1	0.2	9.1	2.8	2.1	0.2	0.6	0	0.1

Existing + Project Phase 3 PM
4: SR 41 SB Ramp & Bush Street
08/24/2019

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	292	145	105	415	0	0	0	0	115	0	79
Future Vol, veh/h	0	292	145	105	415	0	0	0	0	115	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	352	175	117	461	0	0	0	0	120	0	82

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	527	0	0	1135	1222	231
Stage 1	-	-	-	-	-	-	695	695	-
Stage 2	-	-	-	-	-	-	440	527	-
Critical Hdwy	-	-	-	4.175	-	-	6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-	5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-	3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	1020	-	0	206	176	764
Stage 1	0	-	-	-	-	0	451	437	-
Stage 2	0	-	-	-	-	0	641	521	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1020	-	-	182	0	764
Mov Cap-2 Maneuver	-	-	-	-	-	-	182	0	-
Stage 1	-	-	-	-	-	-	451	0	-
Stage 2	-	-	-	-	-	-	567	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.8	37.6
HCM LOS			E

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1020	-	182	764
HCM Lane V/C Ratio	-	-	0.114	-	0.658	0.108
HCM Control Delay (s)	-	-	9	-	56.4	10.3
HCM Lane LOS	-	-	A	-	F	B
HCM 95th %tile Q(veh)	-	-	0.4	-	3.9	0.4

Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	61	346	0	0	306	98	214	1	237	0	0	0
Future Vol, veh/h	61	346	0	0	306	98	214	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	70	398	0	0	348	111	233	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	459	0	-	-	-	0	712	997	398
Stage 1	-	-	-	-	-	-	538	538	-
Stage 2	-	-	-	-	-	-	174	459	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1088	-	0	0	-	-	379	241	646
Stage 1	-	-	0	0	-	-	579	517	-
Stage 2	-	-	0	0	-	-	834	561	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1088	-	-	-	-	-	355	0	646
Mov Cap-2 Maneuver	-	-	-	-	-	-	355	0	-
Stage 1	-	-	-	-	-	-	542	0	-
Stage 2	-	-	-	-	-	-	834	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0	23
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	355	646	1088	-	-	-
HCM Lane V/C Ratio	0.658	0.399	0.064	-	-	-
HCM Control Delay (s)	32.7	14.2	8.5	-	-	-
HCM Lane LOS	D	B	A	-	-	-
HCM 95th %tile Q(veh)	4.5	1.9	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	217	245	121	18	189	16	89	57	19	16	42	126
Future Vol, veh/h	217	245	121	18	189	16	89	57	19	16	42	126
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	255	288	142	20	208	18	96	61	20	17	45	134
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	15.3	12.4	12.3	11.9
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	80%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	20%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	89	57	19	217	245	121	18	126	79	16	42
LT Vol	89	0	0	217	0	0	18	0	0	16	0
Through Vol	0	57	0	0	245	0	0	126	63	0	42
RT Vol	0	0	19	0	0	121	0	0	16	0	0
Lane Flow Rate	96	61	20	255	288	142	20	138	87	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.219	0.131	0.04	0.504	0.53	0.234	0.043	0.285	0.175	0.039	0.096
Departure Headway (Hd)	8.222	7.722	7.022	7.114	6.614	5.914	7.913	7.413	7.271	8.214	7.714
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	437	465	510	511	548	611	453	485	494	437	465
Service Time	5.961	5.461	4.761	4.814	4.314	3.614	5.652	5.152	5.01	5.95	5.45
HCM Lane V/C Ratio	0.22	0.131	0.039	0.499	0.526	0.232	0.044	0.285	0.176	0.039	0.097
HCM Control Delay	13.3	11.6	10.1	16.8	16.5	10.4	11	13.1	11.6	11.3	11.3
HCM Lane LOS	B	B	B	C	C	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.8	3.1	0.9	0.1	1.2	0.6	0.1	0.3

APPENDIX K

EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3

CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ---------------- ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. --------- ☐

☒ URBAN (U)

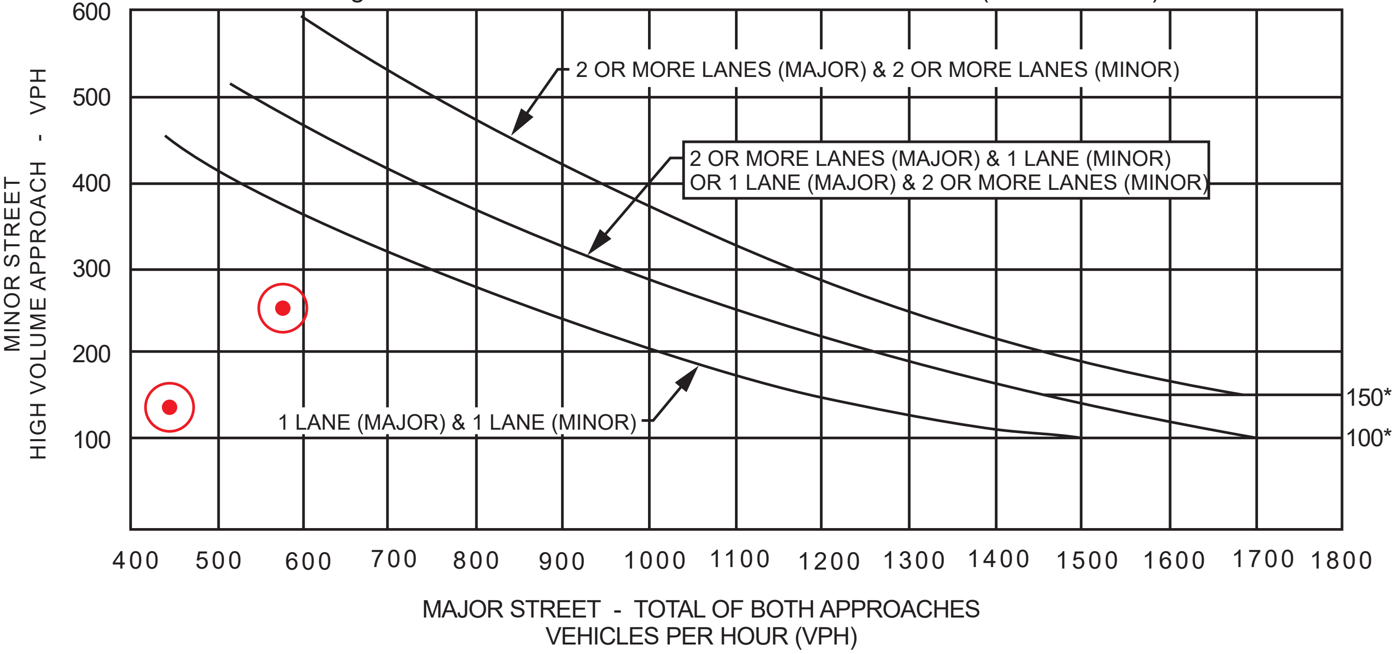
CONDITION: EXISTING (2018) + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	576	443			
Highest Approaches - Minor Street	✓		253	135			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: SEMAS Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐
or
In built up area of isolated community of < 10,000 pop. ☐ RURAL (R)

☒ URBAN (U)

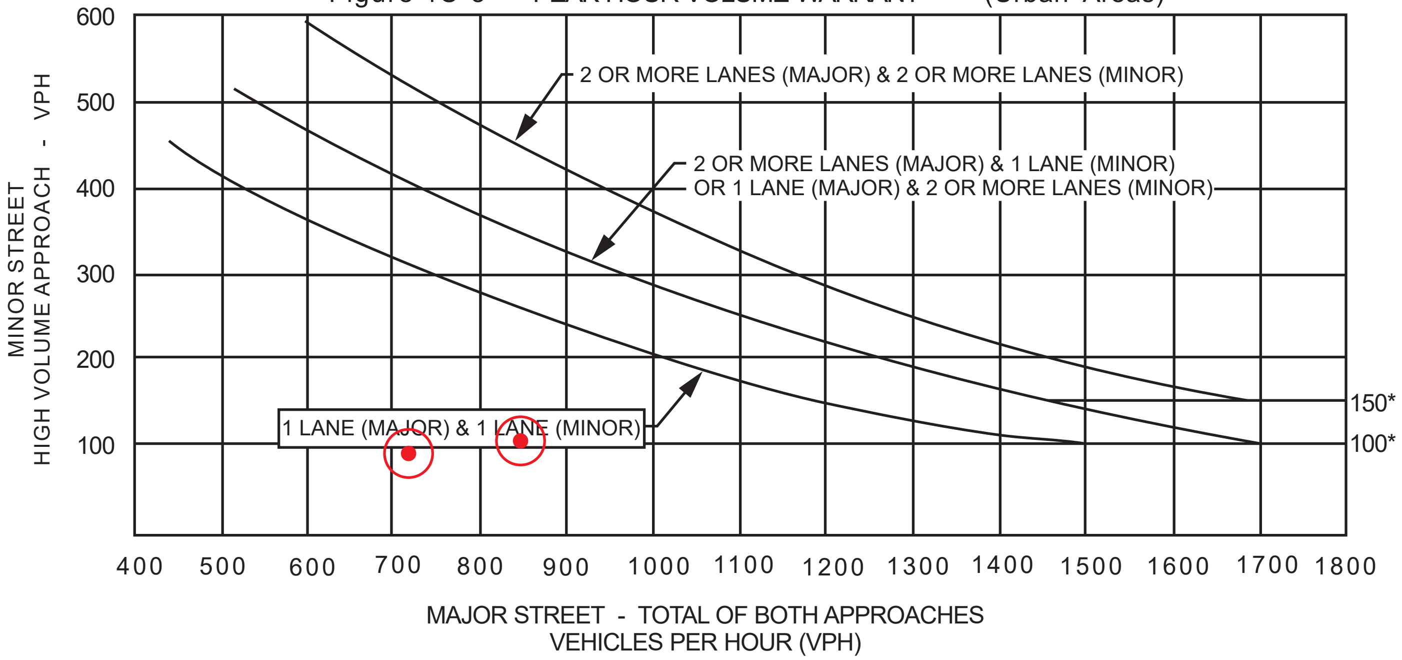
CONDITION: EXISTING (2018) + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street	✓		846	720			
Highest Approaches - Minor Street	✓		102	90			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 40 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

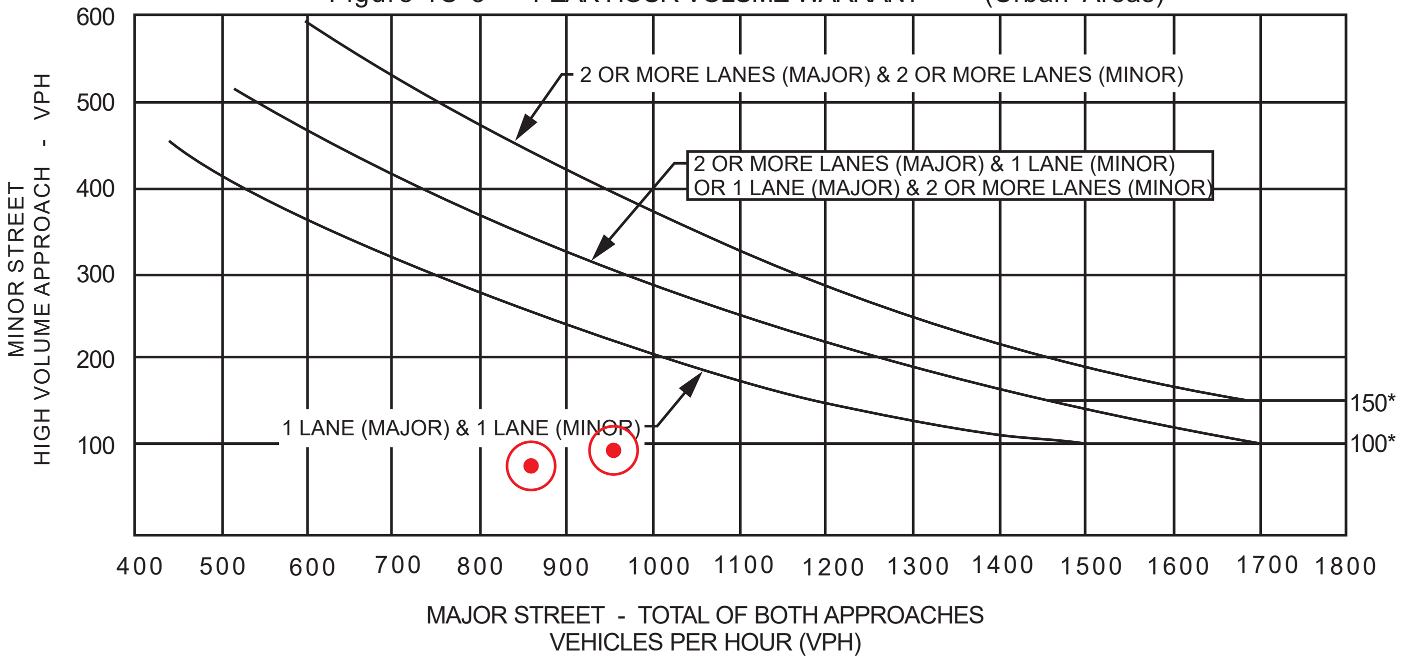
CONDITION: EXISTING (2018) + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	953	858			
Highest Approaches - Minor Street	✓		94	77			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐
☒ URBAN (U)

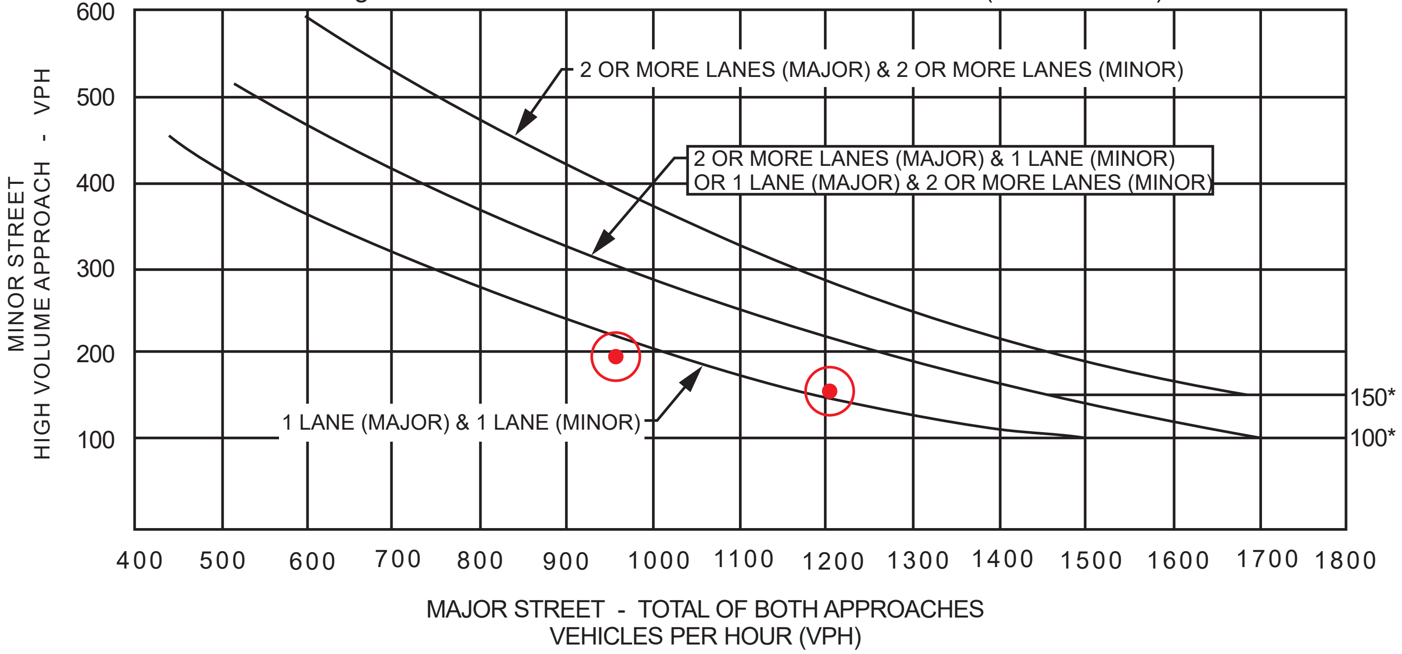
CONDITION: EXISTING (2018) + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1203	957			
Highest Approaches - Minor Street	✓		156	194			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ---------------- ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. --------- ☐
☒ URBAN (U)

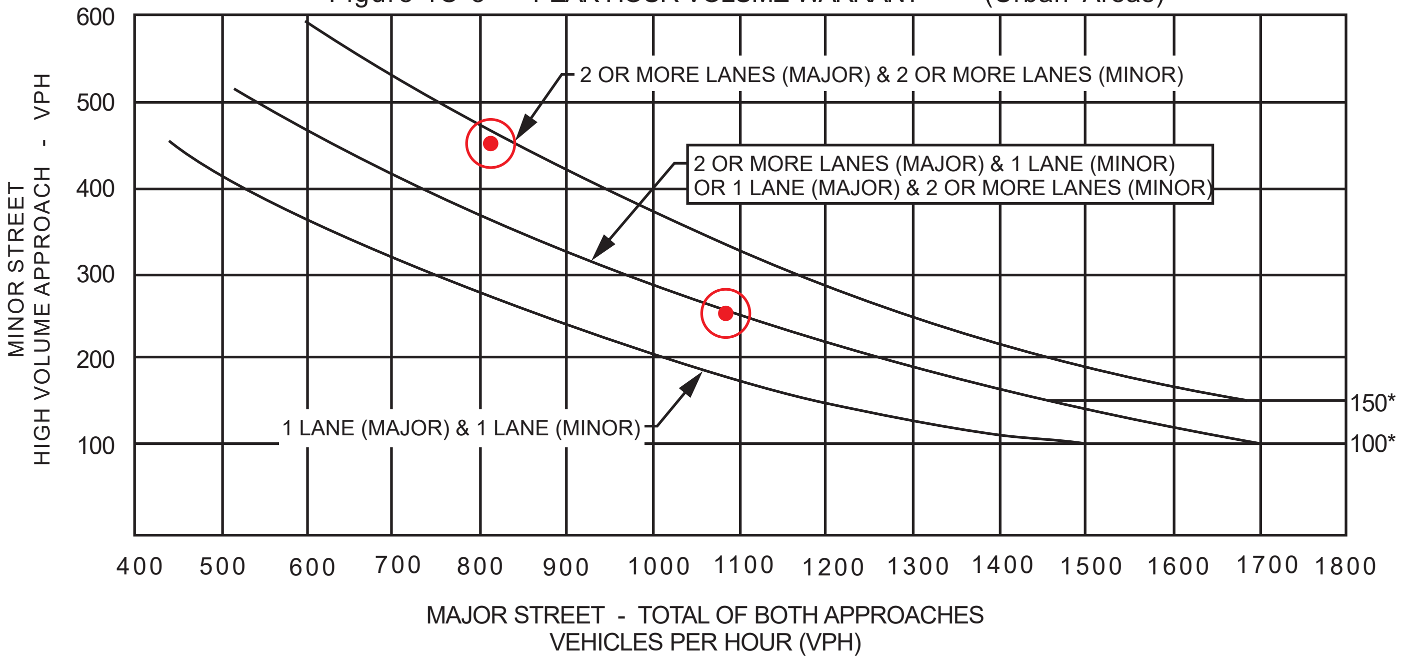
CONDITION: EXISTING (2018) + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☒ NO ☐

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1083	811			
Highest Approaches - Minor Street		✓	264	452			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐
☒ URBAN (U)

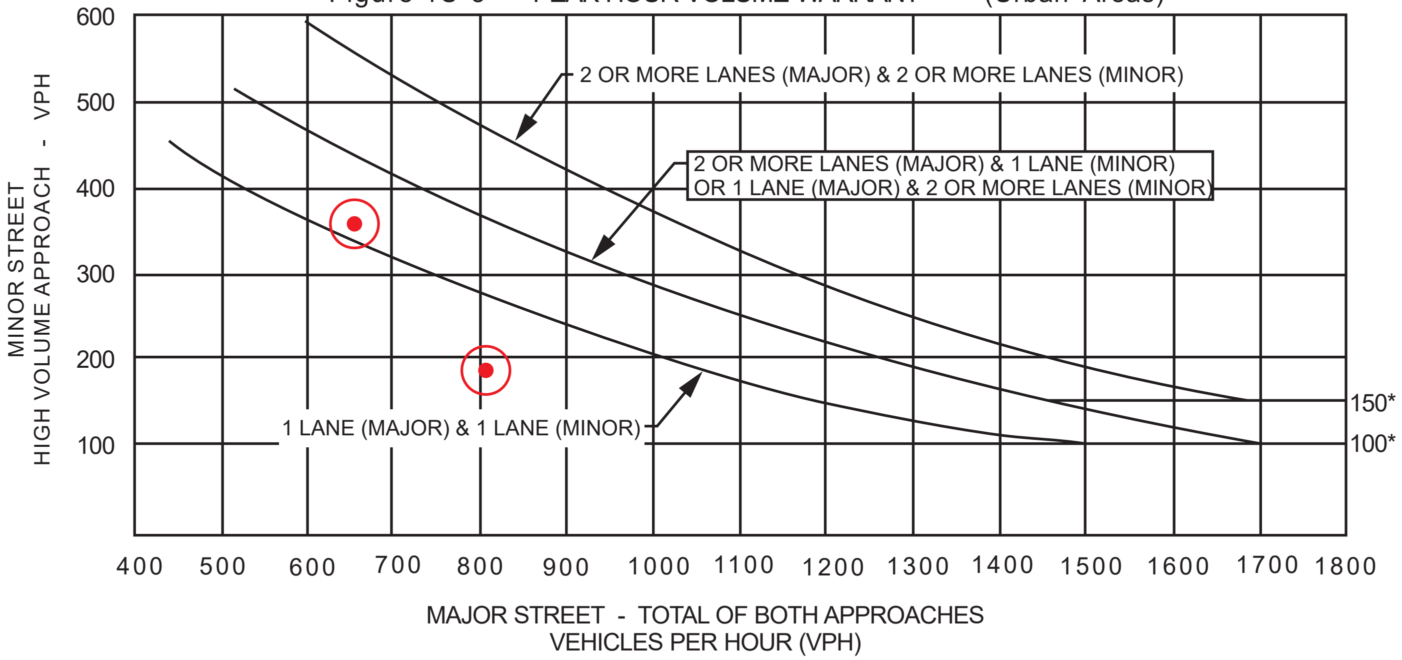
CONDITION: EXISTING (2018) + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	657	807			
Highest Approaches - Minor Street	✓		360	184			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX L

MITIGATED

EXISTING (2018) PLUS PROJECT PHASES 1, 2, & 3

CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

1: College Avenue & Bush Street

Intersection	
Int Delay, s/veh	9.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	41	5	289	241	7	246
Future Vol, veh/h	41	5	289	241	7	246
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	58	58	45	45
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	6	498	416	16	547

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	58	0	1464	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	1412	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1546	-	141	1016
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	225	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	96	1016
Mov Cap-2 Maneuver	-	-	-	-	96	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	153	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.6	19.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	803	-	-	1546	-
HCM Lane V/C Ratio	0.7	-	-	0.322	-
HCM Control Delay (s)	19.2	-	-	8.4	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	5.9	-	-	1.4	-

2: Semas Drive & Bush Street

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	⋎	
Traffic Vol, veh/h	282	5	38	522	8	93
Future Vol, veh/h	282	5	38	522	8	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	53	53	58	58	55	55
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	532	9	66	900	15	169

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	541	0	1569	537
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	1032	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1028	-	122	544
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	344	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1028	-	106	544
Mov Cap-2 Maneuver	-	-	-	-	106	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	300	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	20.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	410	-	-	1028	-
HCM Lane V/C Ratio	0.448	-	-	0.064	-
HCM Control Delay (s)	20.7	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.3	-	-	0.2	-

Mitigated Existing + Project Phase 3 AM
3: Belle Haven & Bush Street

08/24/2019

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	36	672	33	839	74	11	68	78	63
v/c Ratio	0.23	0.96	0.21	0.63	0.11	0.07	0.09	0.45	0.07
Control Delay	42.2	54.8	29.6	17.6	0.4	38.8	0.3	46.8	0.2
Queue Delay	0.0	2.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	57.1	29.6	18.1	0.4	38.8	0.3	46.8	0.2
Queue Length 50th (ft)	19	367	17	95	0	6	0	42	0
Queue Length 95th (ft)	28	238	28	71	0	14	0	63	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	156	699	156	1331	659	154	717	187	862
Starvation Cap Reductn	0	0	0	167	0	0	0	0	0
Spillback Cap Reductn	0	10	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.98	0.21	0.72	0.11	0.07	0.10	0.42	0.07

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑	↱
Traffic Volume (veh/h)	19	346	10	20	512	45	6	0	39	52	0	42
Future Volume (veh/h)	19	346	10	20	512	45	6	0	39	52	0	42
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	36	653	19	33	839	74	11	0	68	78	0	63
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	92	672	20	88	1311	571	226	0	350	259	448	380
Arrive On Green	0.05	0.38	0.38	0.10	0.75	0.75	0.13	0.00	0.22	0.15	0.00	0.24
Sat Flow, veh/h	1753	1780	52	1753	3497	1523	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	36	0	672	33	839	74	11	0	68	78	0	63
Grp Sat Flow(s),veh/h/ln	1753	0	1831	1753	1749	1523	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	1.8	0.0	32.5	1.6	10.4	0.7	0.5	0.0	3.2	3.6	0.0	2.3
Cycle Q Clear(g_c), s	1.8	0.0	32.5	1.6	10.4	0.7	0.5	0.0	3.2	3.6	0.0	2.3
Prop In Lane	1.00		0.03	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	92	0	692	88	1311	571	226	0	350	259	448	380
V/C Ratio(X)	0.39	0.00	0.97	0.38	0.64	0.13	0.05	0.00	0.19	0.30	0.00	0.17
Avail Cap(c_a), veh/h	158	0	692	158	1321	575	226	0	350	259	448	380
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.2	0.0	27.5	39.2	8.3	2.6	34.4	0.0	28.3	34.2	0.0	17.1
Incr Delay (d2), s/veh	2.7	0.0	27.1	2.6	1.0	0.1	0.1	0.0	1.2	0.6	0.0	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	0.0	18.2	0.7	2.5	0.4	0.2	0.0	1.3	1.5	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.9	0.0	54.6	41.8	9.3	2.7	34.4	0.0	29.5	34.8	0.0	18.0
LnGrp LOS	D	A	D	D	A	A	C	A	C	C	A	B
Approach Vol, veh/h		708			946			79			141	
Approach Delay, s/veh		54.1			10.0			30.2			27.3	
Approach LOS		D			A			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.8	24.7	9.0	38.5	16.1	26.4	9.2	38.2
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	9.7	20.2	8.1	34.0	8.0	21.9	8.1	34.0
Max Q Clear Time (g_c+I1), s	5.6	5.2	3.6	34.5	2.5	4.3	3.8	12.4
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	6.2

Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

4: SR 41 SB Ramp & Bush Street

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	483	271	353	593	80	131
v/c Ratio	0.85	0.40	0.83	0.28	0.16	0.24
Control Delay	16.0	1.7	47.1	4.6	28.5	6.9
Queue Delay	1.7	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	1.7	47.1	4.6	28.5	6.9
Queue Length 50th (ft)	65	0	190	25	36	0
Queue Length 95th (ft)	39	1	273	55	62	25
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	639	719	491	2371	504	539
Starvation Cap Reductn	56	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.38	0.72	0.25	0.16	0.24

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	280	157	286	480	0	0	0	0	59	0	97
Future Volume (veh/h)	0	280	157	286	480	0	0	0	0	59	0	97
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	483	271	353	593	0				80	0	131
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	548	464	393	2000	0				575	0	511
Arrive On Green	0.00	0.30	0.30	0.22	0.57	0.00				0.33	0.00	0.33
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1559
Grp Volume(v), veh/h	0	483	271	353	593	0				80	0	131
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1559
Q Serve(g_s), s	0.0	22.5	13.3	17.6	7.9	0.0				2.9	0.0	5.5
Cycle Q Clear(g_c), s	0.0	22.5	13.3	17.6	7.9	0.0				2.9	0.0	5.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	548	464	393	2000	0				575	0	511
V/C Ratio(X)	0.00	0.88	0.58	0.90	0.30	0.00				0.14	0.00	0.26
Avail Cap(c_a), veh/h	0	644	546	497	2390	0				575	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.30	0.30	0.54	0.54	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	30.1	26.9	33.9	9.9	0.0				21.3	0.0	22.2
Incr Delay (d2), s/veh	0.0	4.1	0.4	9.8	0.0	0.0				0.5	0.0	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	0.0	10.1	4.8	8.3	2.7	0.0				1.2	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	34.2	27.2	43.7	10.0	0.0				21.8	0.0	23.4
LnGrp LOS	A	C	C	D	A	A				C	A	C
Approach Vol, veh/h		754			946						211	
Approach Delay, s/veh		31.7			22.6						22.8	
Approach LOS		C			C						C	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			24.7	31.3		34.0		56.0				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			25.5	31.5		19.5		61.5				
Max Q Clear Time (g_c+I1), s			19.6	24.5		7.5		9.9				
Green Ext Time (p_c), s			0.6	2.3		0.6		4.5				
Intersection Summary												
HCM 6th Ctrl Delay			26.2									
HCM 6th LOS			C									

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	100	456	908	246	111
v/c Ratio	0.49	0.52	0.77	0.33	0.15
Control Delay	21.1	9.1	29.8	22.5	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	9.1	29.8	22.5	5.4
Queue Length 50th (ft)	45	55	226	97	0
Queue Length 95th (ft)	53	0	234	146	22
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	262	1117	1397	742	726
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.38	0.41	0.65	0.33	0.15

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	61	278	0	0	586	158	180	2	82	0	0	0
Future Volume (veh/h)	61	278	0	0	586	158	180	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	100	456	0	0	715	193	243	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	144	832	0	0	865	233	789	10	710			
Arrive On Green	0.16	0.90	0.00	0.00	0.32	0.32	0.45	0.45	0.45			
Sat Flow, veh/h	1767	1856	0	0	2823	737	1747	22	1572			
Grp Volume(v), veh/h	100	456	0	0	462	446	246	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1704	1768	0	1572			
Q Serve(g_s), s	4.8	4.5	0.0	0.0	21.8	21.8	8.0	0.0	3.7			
Cycle Q Clear(g_c), s	4.8	4.5	0.0	0.0	21.8	21.8	8.0	0.0	3.7			
Prop In Lane	1.00		0.00	0.00		0.43	0.99		1.00			
Lane Grp Cap(c), veh/h	144	832	0	0	558	540	799	0	710			
V/C Ratio(X)	0.69	0.55	0.00	0.00	0.83	0.83	0.31	0.00	0.16			
Avail Cap(c_a), veh/h	265	1124	0	0	715	691	799	0	710			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.42	0.42	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.6	2.8	0.0	0.0	28.5	28.5	15.7	0.0	14.6			
Incr Delay (d2), s/veh	2.5	0.2	0.0	0.0	6.3	6.5	1.0	0.0	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			
%ile BackOfQ(50%),veh/ln	2.0	1.0	0.0	0.0	9.7	9.4	3.3	0.0	1.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.1	3.0	0.0	0.0	34.8	35.0	16.7	0.0	15.0			
LnGrp LOS	D	A	A	A	C	D	B	A	B			
Approach Vol, veh/h		556			908			357				
Approach Delay, s/veh		9.5			34.9			16.2				
Approach LOS		A			C			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		45.2		44.8			11.8	33.0				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		26.5		54.5			13.5	36.5				
Max Q Clear Time (g_c+I1), s		10.0		6.5			6.8	23.8				
Green Ext Time (p_c), s		1.6		3.1			0.1	4.7				
Intersection Summary												
HCM 6th Ctrl Delay			23.5									
HCM 6th LOS			C									

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	32.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	101	180	79	22	250	22	193	53	19	32	59	301
Future Vol, veh/h	101	180	79	22	250	22	193	53	19	32	59	301
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	187	333	146	26	291	26	276	76	27	36	67	342
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	32.4	20.7	34.5	38.4
HCM LOS	D	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	193	53	19	101	180	79	22	167	105	32	59	301
LT Vol	193	0	0	101	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	180	0	0	167	83	0	59	0
RT Vol	0	0	19	0	0	79	0	0	22	0	0	301
Lane Flow Rate	276	76	27	187	333	146	26	194	122	36	67	342
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.785	0.205	0.068	0.5	0.846	0.343	0.074	0.535	0.333	0.102	0.18	0.85
Departure Headway (Hd)	10.244	9.744	9.044	9.632	9.132	8.432	10.439	9.939	9.792	10.146	9.646	8.946
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	353	367	395	374	397	426	342	362	366	353	371	404
Service Time	8.027	7.527	6.827	7.405	6.905	6.205	8.226	7.726	7.58	7.926	7.426	6.726
HCM Lane V/C Ratio	0.782	0.207	0.068	0.5	0.839	0.343	0.076	0.536	0.333	0.102	0.181	0.847
HCM Control Delay	42	15	12.5	21.7	45.8	15.6	14.1	23.7	17.4	14.1	14.5	45.7
HCM Lane LOS	E	B	B	C	E	C	B	C	C	B	B	E
HCM 95th-tile Q	6.5	0.8	0.2	2.7	8	1.5	0.2	3	1.4	0.3	0.6	8.1

Mitigated Existing + Project Phase 3 PM
1: College Avenue & Bush Street

Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↱	
Traffic Vol, veh/h	156	4	144	139	4	131
Future Vol, veh/h	156	4	144	139	4	131
Conflicting Peds, #/hr	0	0	0	0	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	80	394	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	65	65	65	65
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	188	5	222	214	6	202

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	193	0	848	190
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	660	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1380	-	332	852
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	514	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1380	-	278	850
Mov Cap-2 Maneuver	-	-	-	-	278	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	801	-	-	1380	-
HCM Lane V/C Ratio	0.259	-	-	0.161	-
HCM Control Delay (s)	11.1	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1	-	-	0.6	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	283	4	160	274	9	81
Future Vol, veh/h	283	4	160	274	9	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	65	65	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	368	5	246	422	13	114

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	373	0	1285	371
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	914	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1185	-	182	675
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	391	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1185	-	133	675
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	285	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.3	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	480	-	-	1185	-
HCM Lane V/C Ratio	0.264	-	-	0.208	-
HCM Control Delay (s)	15.2	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.8	-

	↗	→	↙	←	↖	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	13	459	50	510	58	9	36	75	3	24
v/c Ratio	0.08	0.89	0.29	0.43	0.09	0.05	0.06	0.41	0.00	0.03
Control Delay	33.9	48.8	23.2	17.2	0.4	33.5	9.0	40.2	18.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	48.8	23.2	17.2	0.4	33.5	9.0	40.2	18.0	0.1
Queue Length 50th (ft)	6	212	16	22	0	4	0	36	1	0
Queue Length 95th (ft)	19	265	37	52	0	17	22	63	6	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	170	539	170	1238	645	170	592	197	851	831
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.85	0.29	0.41	0.09	0.05	0.06	0.38	0.00	0.03

Intersection Summary

Mitigated Existing + Project Phase 3 PM
3: Belle Haven & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑	↱
Traffic Volume (veh/h)	10	349	5	40	408	46	8	1	31	57	2	18
Future Volume (veh/h)	10	349	5	40	408	46	8	1	31	57	2	18
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	13	453	6	50	510	58	9	1	35	75	3	24
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	43	497	7	116	1103	492	266	11	388	294	498	422
Arrive On Green	0.03	0.28	0.28	0.13	0.64	0.64	0.15	0.26	0.26	0.17	0.28	0.28
Sat Flow, veh/h	1725	1783	24	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	13	0	459	50	510	58	9	0	36	75	3	24
Grp Sat Flow(s),veh/h/ln	1725	0	1807	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	0.6	0.0	19.7	2.1	6.0	0.7	0.4	0.0	1.4	3.0	0.1	0.7
Cycle Q Clear(g_c), s	0.6	0.0	19.7	2.1	6.0	0.7	0.4	0.0	1.4	3.0	0.1	0.7
Prop In Lane	1.00		0.01	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	43	0	503	116	1103	492	266	0	399	294	498	422
V/C Ratio(X)	0.30	0.00	0.91	0.43	0.46	0.12	0.03	0.00	0.09	0.25	0.01	0.06
Avail Cap(c_a), veh/h	172	0	542	172	1103	492	266	0	399	294	498	422
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	0.0	27.9	33.2	10.8	3.4	28.8	0.0	22.5	28.8	21.1	14.0
Incr Delay (d2), s/veh	3.8	0.0	19.0	2.5	0.3	0.1	0.1	0.0	0.4	0.5	0.0	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	0.3	0.0	10.5	0.9	1.8	0.4	0.1	0.0	0.5	1.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.1	0.0	46.9	35.7	11.1	3.5	28.8	0.0	23.0	29.2	21.1	14.3
LnGrp LOS	D	A	D	D	B	A	C	A	C	C	C	B
Approach Vol, veh/h		472			618			45			102	
Approach Delay, s/veh		46.8			12.4			24.1			25.5	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.1	25.2	9.9	26.8	16.8	26.5	6.5	30.1
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	9.3	20.7	8.0	24.0	8.0	22.0	8.0	24.0
Max Q Clear Time (g_c+I1), s	5.0	3.4	4.1	21.7	2.4	2.7	2.6	8.0
Green Ext Time (p_c), s	0.0	0.1	0.0	0.6	0.0	0.0	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	352	175	117	461	120	82
v/c Ratio	0.73	0.33	0.50	0.31	0.15	0.11
Control Delay	13.8	1.8	35.6	14.0	17.9	5.7
Queue Delay	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	1.8	35.6	14.0	17.9	5.7
Queue Length 50th (ft)	56	0	63	51	36	0
Queue Length 95th (ft)	m43	m1	117	67	89	31
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	690	681	313	2127	785	747
Starvation Cap Reductn	16	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.26	0.37	0.22	0.15	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Mitigated Existing + Project Phase 3 PM
4: SR 41 SB Ramp & Bush Street

08/24/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰↑	↱
Traffic Volume (veh/h)	0	292	145	105	415	0	0	0	0	115	0	79
Future Volume (veh/h)	0	292	145	105	415	0	0	0	0	115	0	79
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	352	175	117	461	0				120	0	82
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	431	357	161	1335	0				874	0	778
Arrive On Green	0.00	0.24	0.24	0.09	0.38	0.00				0.50	0.00	0.50
Sat Flow, veh/h	0	1826	1512	1739	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	352	175	117	461	0				120	0	82
Grp Sat Flow(s),veh/h/ln	0	1826	1512	1739	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	14.6	8.0	5.2	7.5	0.0				2.9	0.0	2.2
Cycle Q Clear(g_c), s	0.0	14.6	8.0	5.2	7.5	0.0				2.9	0.0	2.2
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	431	357	161	1335	0				874	0	778
V/C Ratio(X)	0.00	0.82	0.49	0.73	0.35	0.00				0.14	0.00	0.11
Avail Cap(c_a), veh/h	0	696	576	315	2147	0				874	0	778
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.46	0.46	0.74	0.74	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	28.9	26.4	35.3	17.5	0.0				10.6	0.0	10.4
Incr Delay (d2), s/veh	0.0	1.9	0.5	4.6	0.1	0.0				0.3	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	6.3	2.8	2.3	2.8	0.0				1.1	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	30.8	26.9	39.9	17.6	0.0				11.0	0.0	10.7
LnGrp LOS	A	C	C	D	B	A				B	A	B
Approach Vol, veh/h		527			578						202	
Approach Delay, s/veh		29.5			22.1						10.9	
Approach LOS		C			C						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			11.9	23.4		44.7		35.3				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			14.5	30.5		21.5		49.5				
Max Q Clear Time (g_c+I1), s			7.2	16.6		4.9		9.5				
Green Ext Time (p_c), s			0.1	2.3		0.8		3.3				
Intersection Summary												
HCM 6th Ctrl Delay			23.3									
HCM 6th LOS			C									

5: SR 41 NB Ramp & Bush Street

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	70	398	459	234	258
v/c Ratio	0.35	0.63	0.62	0.25	0.27
Control Delay	21.2	10.8	29.0	12.7	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	10.8	29.0	12.7	2.8
Queue Length 50th (ft)	24	54	99	59	0
Queue Length 95th (ft)	m56	74	130	128	41
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	271	970	1104	940	957
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.41	0.42	0.25	0.27

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

Mitigated Existing + Project Phase 3 PM
5: SR 41 NB Ramp & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	61	346	0	0	306	98	214	1	237	0	0	0
Future Volume (veh/h)	61	346	0	0	306	98	214	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	70	398	0	0	348	111	233	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	138	581	0	0	472	148	999	4	892			
Arrive On Green	0.16	0.63	0.00	0.00	0.18	0.18	0.57	0.57	0.57			
Sat Flow, veh/h	1753	1841	0	0	2711	823	1746	7	1560			
Grp Volume(v), veh/h	70	398	0	0	231	228	234	0	258			
Grp Sat Flow(s),veh/h/ln	1753	1841	0	0	1749	1693	1753	0	1560			
Q Serve(g_s), s	2.9	11.2	0.0	0.0	10.0	10.2	5.3	0.0	6.8			
Cycle Q Clear(g_c), s	2.9	11.2	0.0	0.0	10.0	10.2	5.3	0.0	6.8			
Prop In Lane	1.00		0.00	0.00		0.49	1.00		1.00			
Lane Grp Cap(c), veh/h	138	581	0	0	315	305	1003	0	892			
V/C Ratio(X)	0.51	0.69	0.00	0.00	0.73	0.75	0.23	0.00	0.29			
Avail Cap(c_a), veh/h	274	978	0	0	557	540	1003	0	892			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.61	0.61	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	32.3	12.2	0.0	0.0	31.0	31.1	8.5	0.0	8.8			
Incr Delay (d2), s/veh	1.7	0.9	0.0	0.0	3.3	3.7	0.5	0.0	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			
%ile BackOfQ(50%),veh/ln	1.2	3.1	0.0	0.0	4.3	4.3	1.9	0.0	2.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	13.1	0.0	0.0	34.2	34.7	9.0	0.0	9.6			
LnGrp LOS	C	B	A	A	C	C	A	A	A			
Approach Vol, veh/h		468			459			492				
Approach Delay, s/veh		16.2			34.5			9.3				
Approach LOS		B			C			A				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		50.3		29.7			10.8	18.9				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		28.5		42.5			12.5	25.5				
Max Q Clear Time (g_c+I1), s		8.8		13.2			4.9	12.2				
Green Ext Time (p_c), s		2.2		2.5			0.1	2.2				
Intersection Summary												
HCM 6th Ctrl Delay			19.7									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	217	245	121	18	189	16	89	57	19	16	42	126
Future Vol, veh/h	217	245	121	18	189	16	89	57	19	16	42	126
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	255	288	142	20	208	18	96	61	20	17	45	134
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	15.3	12.4	12.3	11.9
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	80%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	20%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	89	57	19	217	245	121	18	126	79	16	42	126
LT Vol	89	0	0	217	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	245	0	0	126	63	0	42	0
RT Vol	0	0	19	0	0	121	0	0	16	0	0	126
Lane Flow Rate	96	61	20	255	288	142	20	138	87	17	45	134
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.219	0.131	0.04	0.504	0.53	0.234	0.043	0.285	0.175	0.039	0.096	0.261
Departure Headway (Hd)	8.222	7.722	7.022	7.114	6.614	5.914	7.913	7.413	7.271	8.214	7.714	7.014
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	437	465	510	511	548	611	453	485	494	437	465	512
Service Time	5.961	5.461	4.761	4.814	4.314	3.614	5.652	5.152	5.01	5.95	5.45	4.75
HCM Lane V/C Ratio	0.22	0.131	0.039	0.499	0.526	0.232	0.044	0.285	0.176	0.039	0.097	0.262
HCM Control Delay	13.3	11.6	10.1	16.8	16.5	10.4	11	13.1	11.6	11.3	11.3	12.2
HCM Lane LOS	B	B	B	C	C	B	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.8	3.1	0.9	0.1	1.2	0.6	0.1	0.3	1

APPENDIX M

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Existing + Approved/Pending/Proposed AM
1: College Avenue & Bush Street

03/02/2019

Intersection	
Int Delay, s/veh	12.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱			✥			✥	
Traffic Vol, veh/h	2	53	7	292	257	3	8	0	180	11	1	5
Future Vol, veh/h	2	53	7	292	257	3	8	0	180	11	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	58	58	58	45	45	45	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	67	9	503	443	5	18	0	400	20	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	448	0	0	76	0	0	1530	1527	67	1730	1534	446
Stage 1	-	-	-	-	-	-	73	73	-	1452	1452	-
Stage 2	-	-	-	-	-	-	1457	1454	-	278	82	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1112	-	-	1523	-	-	96	117	997	69	116	612
Stage 1	-	-	-	-	-	-	937	834	-	162	195	-
Stage 2	-	-	-	-	-	-	161	195	-	728	827	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1112	-	-	1523	-	-	69	78	997	31	77	612
Mov Cap-2 Maneuver	-	-	-	-	-	-	69	78	-	31	77	-
Stage 1	-	-	-	-	-	-	934	831	-	162	131	-
Stage 2	-	-	-	-	-	-	105	131	-	435	825	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.5	21	184
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	634	1112	-	-	1523	-	-	45
HCM Lane V/C Ratio	0.659	0.002	-	-	0.331	-	-	0.675
HCM Control Delay (s)	21	8.2	0	-	8.5	-	-	184
HCM Lane LOS	C	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	4.9	0	-	-	1.5	-	-	2.6

Intersection	
Intersection Delay, s/veh	53
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	23	253	16	20	480	45	12	0	39	52	0	44
Future Vol, veh/h	23	253	16	20	480	45	12	0	39	52	0	44
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	43	477	30	33	787	74	21	0	68	78	0	66
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	116	24.3	13.3	14
HCM LOS	F	C	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	8%	8%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	87%	92%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	5%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	39	292	260	245	41	52	0	44
LT Vol	12	0	23	20	0	0	52	0	0
Through Vol	0	0	253	240	240	0	0	0	0
RT Vol	0	39	16	0	5	41	0	0	44
Lane Flow Rate	21	68	551	426	401	66	78	0	66
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.056	0.159	1.152	0.758	0.707	0.104	0.201	0	0.148
Departure Headway (Hd)	10.138	8.887	7.526	6.678	6.625	5.923	9.85	9.33	8.602
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	355	406	479	546	549	609	366	0	420
Service Time	7.838	6.587	5.311	4.378	4.325	3.623	7.55	7.03	6.302
HCM Lane V/C Ratio	0.059	0.167	1.15	0.78	0.73	0.108	0.213	0	0.157
HCM Control Delay	13.4	13.3	116	27.3	23.7	9.3	15	12	12.8
HCM Lane LOS	B	B	F	D	C	A	B	N	B
HCM 95th-tile Q	0.2	0.6	19.5	6.7	5.6	0.3	0.7	0	0.5

4: SR 41 SB Ramp & Bush Street

Intersection	
Int Delay, s/veh	23.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	213	131	286	453	0	0	0	0	59	0	92
Future Vol, veh/h	0	213	131	286	453	0	0	0	0	59	0	92
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	367	226	353	559	0	0	0	0	80	0	124

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	593	0	0				1746	1858	281
Stage 1	-	-	-	-	-	-				1265	1265	-
Stage 2	-	-	-	-	-	-				481	593	-
Critical Hdwy	-	-	-	4.16	-	-				6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-				5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-				3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	969	-	0				84	72	712
Stage 1	0	-	-	-	-	0				227	237	-
Stage 2	0	-	-	-	-	0				616	488	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	969	-	-				~ 53	0	711
Mov Cap-2 Maneuver	-	-	-	-	-	-				~ 53	0	-
Stage 1	-	-	-	-	-	-				227	0	-
Stage 2	-	-	-	-	-	-				392	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.2	174.4
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	969	-	53	711
HCM Lane V/C Ratio	-	-	0.364	-	1.504	0.175
HCM Control Delay (s)	-	-	10.8	-	$ 429	11.1
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	1.7	-	7.4	0.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	9.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	45	227	0	0	570	158	169	2	82	0	0	0
Future Vol, veh/h	45	227	0	0	570	158	169	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	74	372	0	0	695	193	228	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	888	0	-	-	-	0	868	1408	372
Stage 1	-	-	-	-	-	-	520	520	-
Stage 2	-	-	-	-	-	-	348	888	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	755	-	0	0	-	-	305	137	670
Stage 1	-	-	0	0	-	-	593	529	-
Stage 2	-	-	0	0	-	-	684	359	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	755	-	-	-	-	-	275	0	670
Mov Cap-2 Maneuver	-	-	-	-	-	-	275	0	-
Stage 1	-	-	-	-	-	-	535	0	-
Stage 2	-	-	-	-	-	-	684	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.7	0	45.1
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	275	670	755	-	-	-
HCM Lane V/C Ratio	0.84	0.165	0.098	-	-	-
HCM Control Delay (s)	61.2	11.4	10.3	-	-	-
HCM Lane LOS	F	B	B	-	-	-
HCM 95th %tile Q(veh)	7	0.6	0.3	-	-	-

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	25.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	100	137	72	22	237	22	191	53	19	32	59	300
Future Vol, veh/h	100	137	72	22	237	22	191	53	19	32	59	300
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	185	254	133	26	276	26	273	76	27	36	67	341
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	21.4	18.6	29.7	32.2
HCM LOS	C	C	D	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	78%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	22%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	191	53	19	100	137	72	22	158	101	32	59
LT Vol	191	0	0	100	0	0	22	0	0	32	0
Through Vol	0	53	0	0	137	0	0	158	79	0	59
RT Vol	0	0	19	0	0	72	0	0	22	0	0
Lane Flow Rate	273	76	27	185	254	133	26	184	117	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.74	0.195	0.065	0.483	0.626	0.303	0.071	0.484	0.305	0.098	0.171
Departure Headway (Hd)	9.762	9.262	8.562	9.383	8.883	8.183	9.99	9.49	9.337	9.669	9.169
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	371	387	418	383	406	439	358	378	384	371	391
Service Time	7.527	7.027	6.327	7.144	6.644	5.944	7.76	7.26	7.107	7.431	6.931
HCM Lane V/C Ratio	0.736	0.196	0.065	0.483	0.626	0.303	0.073	0.487	0.305	0.097	0.171
HCM Control Delay	35.8	14.3	11.9	20.7	25.5	14.5	13.5	20.9	16.2	13.5	13.8
HCM Lane LOS	E	B	B	C	D	B	B	C	C	B	B
HCM 95th-tile Q	5.8	0.7	0.2	2.5	4.1	1.3	0.2	2.5	1.3	0.3	0.6

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	7	174	9	114	158	9	6	0	122	9	1	3
Future Vol, veh/h	7	174	9	114	158	9	6	0	122	9	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	65	65	65	65	65	65	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	210	11	175	243	14	9	0	188	13	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	257	0	0	221	0	0	831	833	212	928	837	252
Stage 1	-	-	-	-	-	-	226	226	-	600	600	-
Stage 2	-	-	-	-	-	-	605	607	-	328	237	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1308	-	-	1348	-	-	289	304	828	248	303	787
Stage 1	-	-	-	-	-	-	777	717	-	488	490	-
Stage 2	-	-	-	-	-	-	485	486	-	685	709	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1308	-	-	1348	-	-	256	263	826	171	262	786
Mov Cap-2 Maneuver	-	-	-	-	-	-	256	263	-	171	262	-
Stage 1	-	-	-	-	-	-	772	712	-	485	426	-
Stage 2	-	-	-	-	-	-	418	423	-	525	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	3.3	11.5	23.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	748	1308	-	-	1348	-	-	216
HCM Lane V/C Ratio	0.263	0.006	-	-	0.13	-	-	0.084
HCM Control Delay (s)	11.5	7.8	0	-	8.1	-	-	23.2
HCM Lane LOS	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	1.1	0	-	-	0.4	-	-	0.3

Intersection	
Intersection Delay, s/veh	15.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			↰↑↱	↱	↰	↱		↰	↑	↱
Traffic Vol, veh/h	18	285	13	40	274	46	24	1	31	57	2	20
Future Vol, veh/h	18	285	13	40	274	46	24	1	31	57	2	20
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	23	370	17	50	343	58	27	1	35	75	3	26
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	22.7	11	10.6	11.5
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	6%	23%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	90%	77%	97%	0%	0%	100%	0%
Vol Right, %	0%	97%	4%	0%	3%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	24	32	316	177	142	41	57	2	20
LT Vol	24	0	18	40	0	0	57	0	0
Through Vol	0	1	285	137	137	0	0	2	0
RT Vol	0	31	13	0	5	41	0	0	20
Lane Flow Rate	27	36	410	221	177	52	75	3	26
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.06	0.068	0.708	0.36	0.281	0.072	0.164	0.005	0.049
Departure Headway (Hd)	8.013	6.809	6.209	5.857	5.72	5.036	7.858	7.349	6.636
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	446	524	583	613	628	710	455	485	537
Service Time	5.785	4.579	3.954	3.598	3.461	2.776	5.626	5.116	4.403
HCM Lane V/C Ratio	0.061	0.069	0.703	0.361	0.282	0.073	0.165	0.006	0.048
HCM Control Delay	11.3	10.1	22.7	11.9	10.7	8.2	12.2	10.2	9.7
HCM Lane LOS	B	B	C	B	B	A	B	B	A
HCM 95th-tile Q	0.2	0.2	5.7	1.6	1.1	0.2	0.6	0	0.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	246	127	105	305	0	0	0	0	115	0	55
Future Vol, veh/h	0	246	127	105	305	0	0	0	0	115	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	296	153	117	339	0	0	0	0	120	0	57

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	449	0	0				946	1022	170
Stage 1	-	-	-	-	-	-				573	573	-
Stage 2	-	-	-	-	-	-				373	449	-
Critical Hdwy	-	-	-	4.175	-	-				6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-				5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-				3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	1091	-	0				270	231	836
Stage 1	0	-	-	-	-	0				521	497	-
Stage 2	0	-	-	-	-	0				688	565	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1091	-	-				241	0	836
Mov Cap-2 Maneuver	-	-	-	-	-	-				241	0	-
Stage 1	-	-	-	-	-	-				521	0	-
Stage 2	-	-	-	-	-	-				614	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	2.2	26
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1091	-	241	836
HCM Lane V/C Ratio	-	-	0.107	-	0.497	0.069
HCM Control Delay (s)	-	-	8.7	-	33.8	9.6
HCM Lane LOS	-	-	A	-	D	A
HCM 95th %tile Q(veh)	-	-	0.4	-	2.5	0.2

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	51	310	0	0	263	98	147	1	237	0	0	0
Future Vol, veh/h	51	310	0	0	263	98	147	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	59	356	0	0	299	111	160	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	410	0	-	-	-	0	624	884	356
Stage 1	-	-	-	-	-	-	474	474	-
Stage 2	-	-	-	-	-	-	150	410	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1135	-	0	0	-	-	429	281	682
Stage 1	-	-	0	0	-	-	620	553	-
Stage 2	-	-	0	0	-	-	857	590	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1135	-	-	-	-	-	407	0	682
Mov Cap-2 Maneuver	-	-	-	-	-	-	407	0	-
Stage 1	-	-	-	-	-	-	588	0	-
Stage 2	-	-	-	-	-	-	857	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.2	0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	407	682	1135	-	-	-
HCM Lane V/C Ratio	0.395	0.378	0.052	-	-	-
HCM Control Delay (s)	19.5	13.4	8.3	-	-	-
HCM Lane LOS	C	B	A	-	-	-
HCM 95th %tile Q(veh)	1.9	1.8	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	215	214	118	18	155	16	84	57	19	16	42	122
Future Vol, veh/h	215	214	118	18	155	16	84	57	19	16	42	122
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	253	252	139	20	170	18	90	61	20	17	45	130
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	13.9	11.5	11.8	11.4
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	76%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	24%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	84	57	19	215	214	118	18	103	68	16	42
LT Vol	84	0	0	215	0	0	18	0	0	16	0
Through Vol	0	57	0	0	214	0	0	103	52	0	42
RT Vol	0	0	19	0	0	118	0	0	16	0	0
Lane Flow Rate	90	61	20	253	252	139	20	114	74	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.197	0.125	0.038	0.48	0.443	0.217	0.042	0.225	0.144	0.037	0.091
Departure Headway (Hd)	7.863	7.363	6.663	6.837	6.337	5.637	7.642	7.142	6.977	7.85	7.35
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	454	484	533	526	566	633	466	500	511	454	485
Service Time	5.652	5.152	4.452	4.604	4.104	3.404	5.429	4.929	4.763	5.639	5.139
HCM Lane V/C Ratio	0.198	0.126	0.038	0.481	0.445	0.22	0.043	0.228	0.145	0.037	0.093
HCM Control Delay	12.6	11.2	9.7	15.8	14.1	10	10.8	12	10.9	10.9	10.9
HCM Lane LOS	B	B	A	C	B	A	B	B	B	B	B
HCM 95th-tile Q	0.7	0.4	0.1	2.6	2.3	0.8	0.1	0.9	0.5	0.1	0.3

APPENDIX N

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

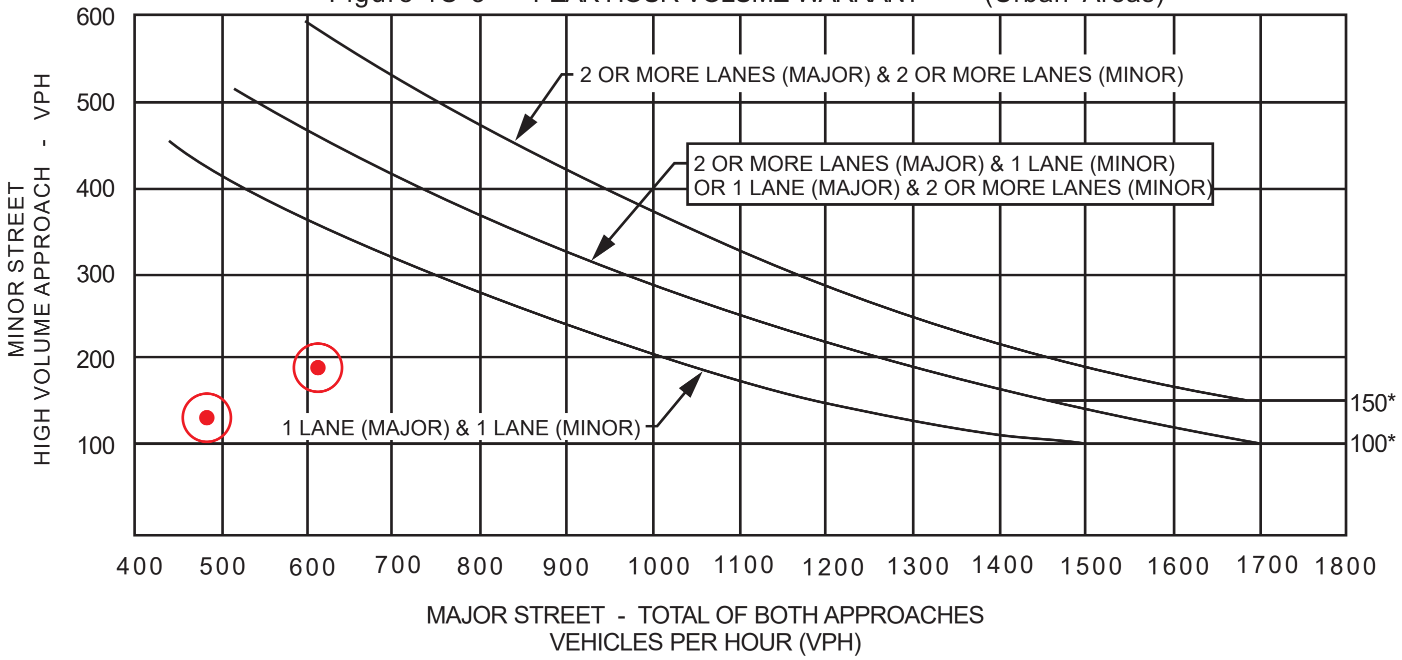
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	614	471			
Highest Approaches - Minor Street	✓		188	128			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 40 mph

Critical speed of major street traffic > 40 mph ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

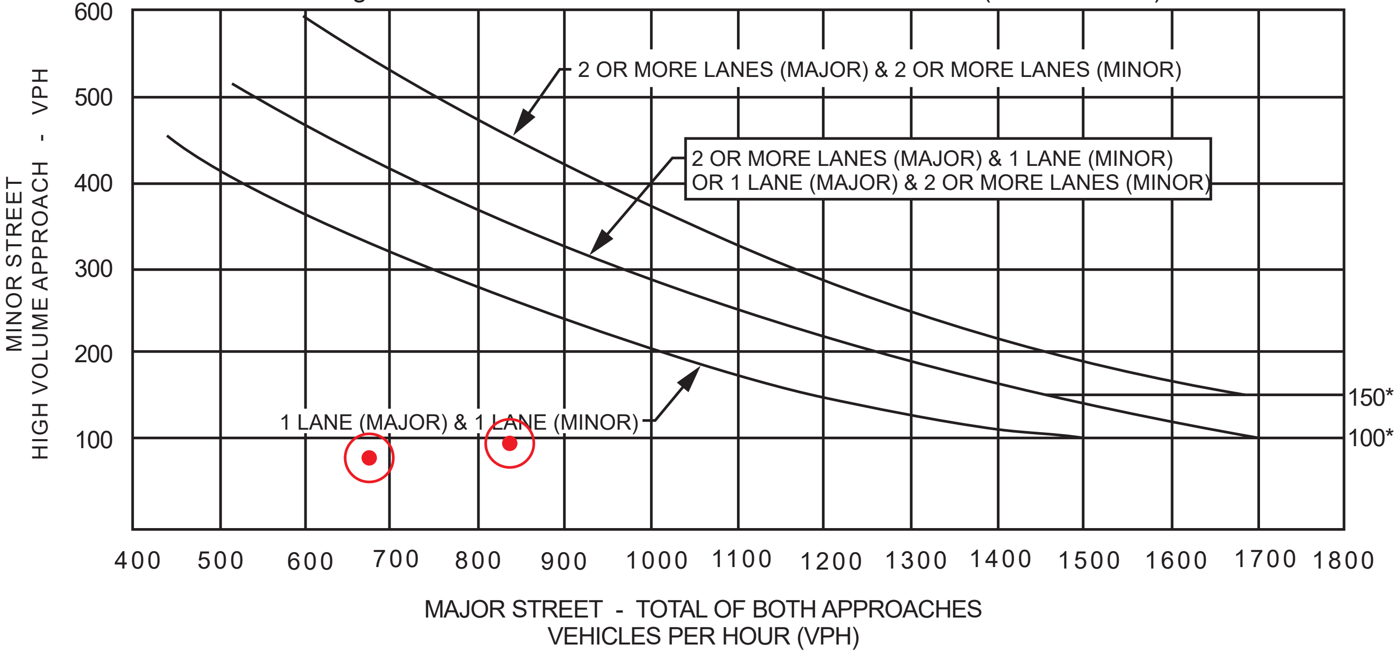
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	837	676			
Highest Approaches - Minor Street	✓		96	79			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

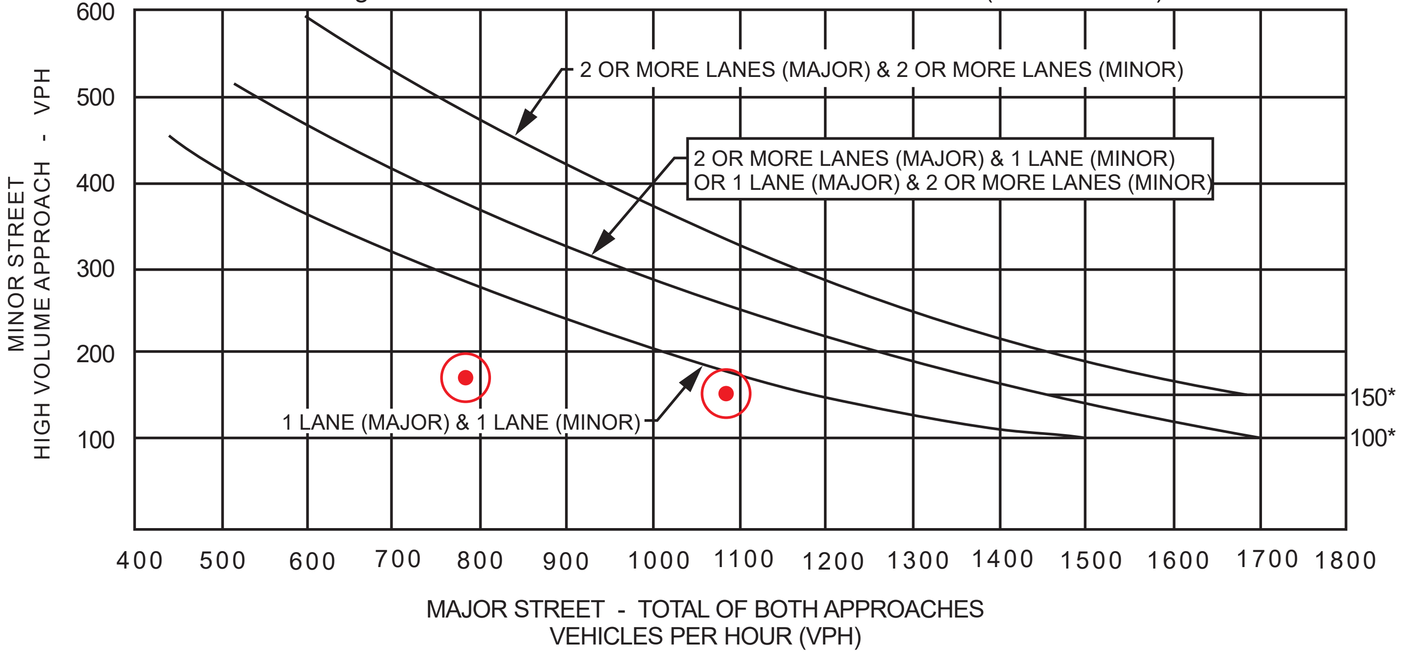
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1083	783			
Highest Approaches - Minor Street	✓		151	170			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

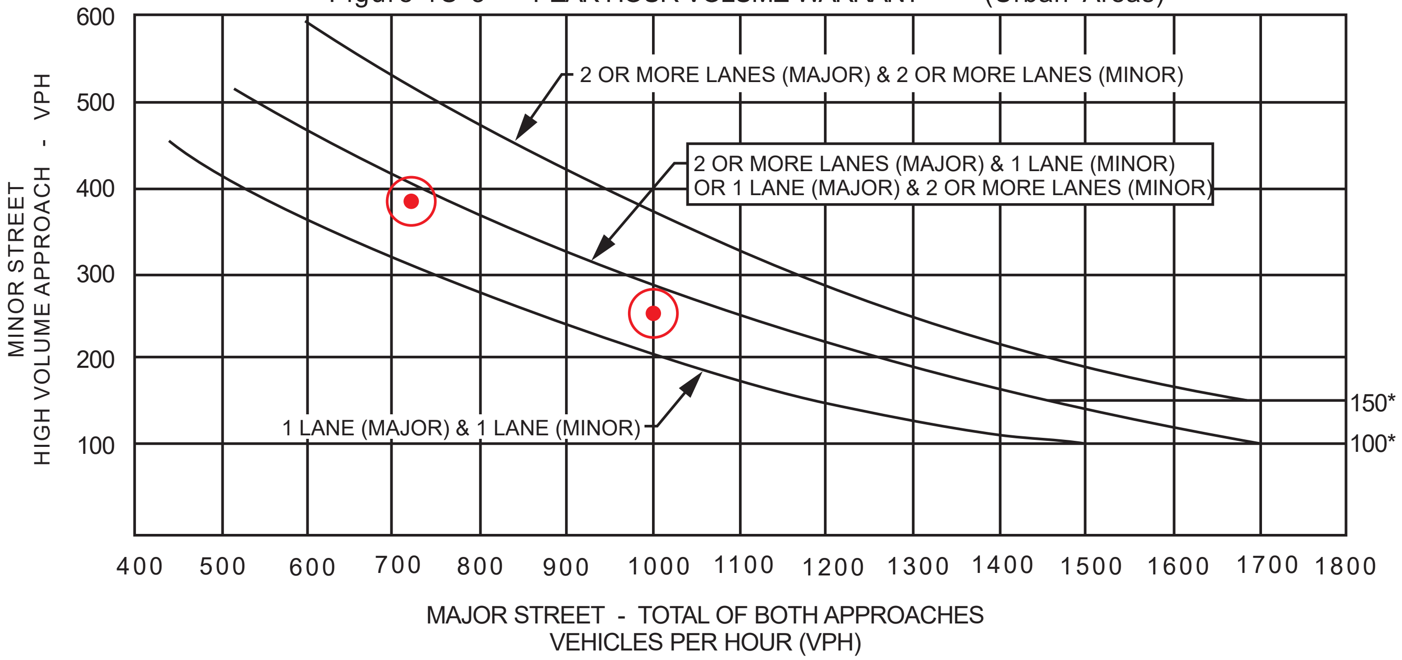
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1000	722			
Highest Approaches - Minor Street	✓		253	385			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 01/28/19 CHK RD DATE 01/29/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

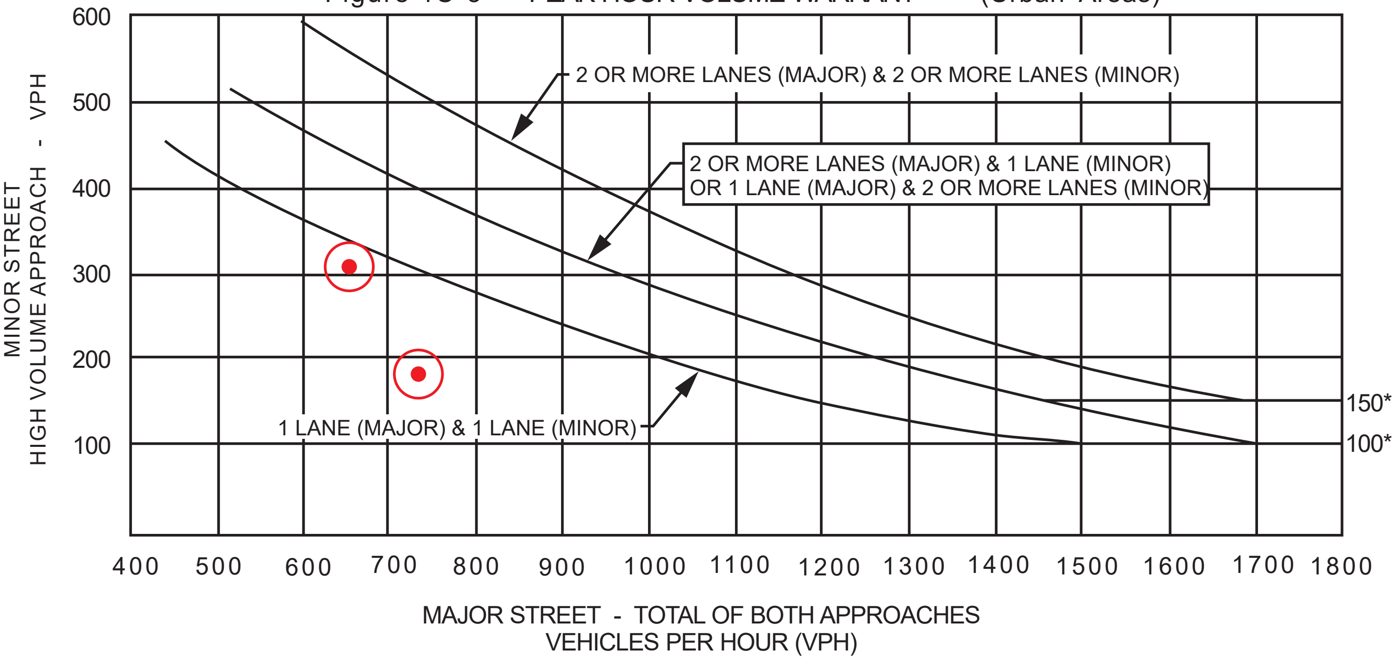
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	654	736			
Highest Approaches - Minor Street	✓		309	180			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX O

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Intersection	
Int Delay, s/veh	16.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱			✥			✥	
Traffic Vol, veh/h	2	53	7	300	257	3	8	0	213	11	1	5
Future Vol, veh/h	2	53	7	300	257	3	8	0	213	11	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	58	58	58	45	45	45	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	67	9	517	443	5	18	0	473	20	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	448	0	0	76	0	0	1558	1555	67	1794	1562	446
Stage 1	-	-	-	-	-	-	73	73	-	1480	1480	-
Stage 2	-	-	-	-	-	-	1485	1482	-	314	82	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1112	-	-	1523	-	-	91	113	997	62	112	612
Stage 1	-	-	-	-	-	-	937	834	-	156	189	-
Stage 2	-	-	-	-	-	-	155	189	-	697	827	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1112	-	-	1523	-	-	65	74	997	24	74	612
Mov Cap-2 Maneuver	-	-	-	-	-	-	65	74	-	24	74	-
Stage 1	-	-	-	-	-	-	934	831	-	156	125	-
Stage 2	-	-	-	-	-	-	99	125	-	365	825	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.6	25	280.6
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	656	1112	-	-	1523	-	-	35
HCM Lane V/C Ratio	0.749	0.002	-	-	0.34	-	-	0.867
HCM Control Delay (s)	25	8.2	0	-	8.6	-	-	280.6
HCM Lane LOS	D	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	6.7	0	-	-	1.5	-	-	3.1

2: Semas Drive & Bush Street

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	0	315	10	16	534	0	9	0	39	0	0	1
Future Vol, veh/h	0	315	10	16	534	0	9	0	39	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	594	19	28	921	0	16	0	71	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	921	0	0	613	0	0	1582	1581	604	1616	1590	921
Stage 1	-	-	-	-	-	-	604	604	-	977	977	-
Stage 2	-	-	-	-	-	-	978	977	-	639	613	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	741	-	-	966	-	-	88	109	498	83	108	328
Stage 1	-	-	-	-	-	-	485	488	-	302	329	-
Stage 2	-	-	-	-	-	-	301	329	-	464	483	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	741	-	-	966	-	-	84	103	498	68	102	328
Mov Cap-2 Maneuver	-	-	-	-	-	-	84	103	-	68	102	-
Stage 1	-	-	-	-	-	-	485	488	-	302	310	-
Stage 2	-	-	-	-	-	-	282	310	-	398	483	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	25.8	16
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	259	741	-	-	966	-	-	328
HCM Lane V/C Ratio	0.337	-	-	-	0.029	-	-	0.006
HCM Control Delay (s)	25.8	0	-	-	8.8	0	-	16
HCM Lane LOS	D	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	0

3: Belle Haven & Bush Street

Intersection	
Intersection Delay, s/veh	93.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	24	318	12	20	500	45	7	0	39	52	0	43
Future Vol, veh/h	24	318	12	20	500	45	7	0	39	52	0	43
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	45	600	23	33	820	74	12	0	68	78	0	64
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	213	26.5	13.8	14.5
HCM LOS	F	D	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	7%	7%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	90%	93%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	3%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	39	354	270	255	41	52	0	43
LT Vol	7	0	24	20	0	0	52	0	0
Through Vol	0	0	318	250	250	0	0	0	0
RT Vol	0	39	12	0	5	41	0	0	43
Lane Flow Rate	12	68	668	443	417	66	78	0	64
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.033	0.16	1.398	0.781	0.73	0.104	0.201	0	0.145
Departure Headway (Hd)	10.632	9.373	7.534	6.847	6.797	6.091	10.278	9.756	9.024
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	339	385	481	531	534	592	352	0	400
Service Time	8.332	7.073	5.314	4.547	4.497	3.791	7.978	7.456	6.724
HCM Lane V/C Ratio	0.035	0.177	1.389	0.834	0.781	0.111	0.222	0	0.16
HCM Control Delay	13.7	13.8	213	29.8	25.7	9.5	15.5	12.5	13.2
HCM Lane LOS	B	B	F	D	D	A	C	N	B
HCM 95th-tile Q	0.1	0.6	31.4	7.1	6.1	0.3	0.7	0	0.5

Existing + Approved/Pending/Proposed + Project Phase 1 AM
4: SR 41 SB Ramp & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	30.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰↑	↱
Traffic Vol, veh/h	0	259	150	286	469	0	0	0	0	59	0	96
Future Vol, veh/h	0	259	150	286	469	0	0	0	0	59	0	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	447	259	353	579	0	0	0	0	80	0	130

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	706	0	0				1863	1991	291
Stage 1	-	-	-	-	-	-				1285	1285	-
Stage 2	-	-	-	-	-	-				578	706	-
Critical Hdwy	-	-	-	4.16	-	-				6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-				5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-				3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	879	-	0				~ 71	59	701
Stage 1	0	-	-	-	-	0				221	231	-
Stage 2	0	-	-	-	-	0				555	434	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	879	-	-				~ 42	0	700
Mov Cap-2 Maneuver	-	-	-	-	-	-				~ 42	0	-
Stage 1	-	-	-	-	-	-				221	0	-
Stage 2	-	-	-	-	-	-				332	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.5	247
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	879	-	42	700
HCM Lane V/C Ratio	-	-	0.402	-	1.898	0.185
HCM Control Delay (s)	-	-	11.8	-	$ 630.6	11.3
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	2	-	8.3	0.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	16.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	57	261	0	0	579	158	176	2	82	0	0	0
Future Vol, veh/h	57	261	0	0	579	158	176	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	93	428	0	0	706	193	238	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	899	0	-	-	-	0	967	1513	428
Stage 1	-	-	-	-	-	-	614	614	-
Stage 2	-	-	-	-	-	-	353	899	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	748	-	0	0	-	-	265	118	623
Stage 1	-	-	0	0	-	-	536	480	-
Stage 2	-	-	0	0	-	-	680	355	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	748	-	-	-	-	-	~ 232	0	623
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 232	0	-
Stage 1	-	-	-	-	-	-	470	0	-
Stage 2	-	-	-	-	-	-	680	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.9	0	82
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	232	623	748	-	-	-
HCM Lane V/C Ratio	1.037	0.178	0.125	-	-	-
HCM Control Delay (s)	114.3	12	10.5	-	-	-
HCM Lane LOS	F	B	B	-	-	-
HCM 95th %tile Q(veh)	10	0.6	0.4	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Intersection Delay, s/veh	29
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	103	163	77	22	244	22	192	53	19	32	59	301
Future Vol, veh/h	103	163	77	22	244	22	192	53	19	32	59	301
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	191	302	143	26	284	26	274	76	27	36	67	342
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	26.7	19.8	32.6	36.1
HCM LOS	D	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	192	53	19	103	163	77	22	163	103	32	59
LT Vol	192	0	0	103	0	0	22	0	0	32	0
Through Vol	0	53	0	0	163	0	0	163	81	0	59
RT Vol	0	0	19	0	0	77	0	0	22	0	0
Lane Flow Rate	274	76	27	191	302	143	26	189	120	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.767	0.201	0.067	0.505	0.758	0.33	0.073	0.514	0.321	0.101	0.176
Departure Headway (Hd)	10.07	9.57	8.87	9.536	9.036	8.336	10.279	9.779	9.63	9.972	9.472
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	359	374	403	378	401	431	348	369	372	359	378
Service Time	7.845	7.345	6.645	7.303	6.803	6.103	8.058	7.558	7.409	7.743	7.243
HCM Lane V/C Ratio	0.763	0.203	0.067	0.505	0.753	0.332	0.075	0.512	0.323	0.1	0.177
HCM Control Delay	39.5	14.8	12.3	21.7	35.3	15.2	13.9	22.5	16.9	13.9	14.3
HCM Lane LOS	E	B	B	C	E	C	B	C	C	B	B
HCM 95th-tile Q	6.2	0.7	0.2	2.7	6.2	1.4	0.2	2.8	1.4	0.3	0.6

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱			✥			✥	
Traffic Vol, veh/h	7	174	9	140	158	9	6	0	131	9	1	3
Future Vol, veh/h	7	174	9	140	158	9	6	0	131	9	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	65	65	65	65	65	65	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	210	11	215	243	14	9	0	202	13	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	257	0	0	221	0	0	911	913	212	1015	917	252
Stage 1	-	-	-	-	-	-	226	226	-	680	680	-
Stage 2	-	-	-	-	-	-	685	687	-	335	237	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1308	-	-	1348	-	-	255	273	828	217	272	787
Stage 1	-	-	-	-	-	-	777	717	-	441	451	-
Stage 2	-	-	-	-	-	-	438	447	-	679	709	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1308	-	-	1348	-	-	220	228	826	143	227	786
Mov Cap-2 Maneuver	-	-	-	-	-	-	220	228	-	143	227	-
Stage 1	-	-	-	-	-	-	772	712	-	438	379	-
Stage 2	-	-	-	-	-	-	364	376	-	509	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	3.7	11.8	26.8
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	737	1308	-	-	1348	-	-	183
HCM Lane V/C Ratio	0.286	0.006	-	-	0.16	-	-	0.099
HCM Control Delay (s)	11.8	7.8	0	-	8.2	-	-	26.8
HCM Lane LOS	B	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	1.2	0	-	-	0.6	-	-	0.3

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	318	7	67	324	0	18	0	34	0	0	2
Future Vol, veh/h	0	318	7	67	324	0	18	0	34	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	413	9	103	498	0	25	0	48	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	498	0	0	422	0	0	1124	1122	418	1146	1126	498
Stage 1	-	-	-	-	-	-	418	418	-	704	704	-
Stage 2	-	-	-	-	-	-	706	704	-	442	422	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1066	-	-	1137	-	-	183	206	635	176	205	572
Stage 1	-	-	-	-	-	-	612	591	-	428	440	-
Stage 2	-	-	-	-	-	-	427	440	-	594	588	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1066	-	-	1137	-	-	165	180	635	147	179	572
Mov Cap-2 Maneuver	-	-	-	-	-	-	165	180	-	147	179	-
Stage 1	-	-	-	-	-	-	612	591	-	428	385	-
Stage 2	-	-	-	-	-	-	372	385	-	549	588	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.5	19.6	11.3
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	320	1066	-	-	1137	-	-	572
HCM Lane V/C Ratio	0.229	-	-	-	0.091	-	-	0.005
HCM Control Delay (s)	19.6	0	-	-	8.5	0	-	11.3
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.9	0	-	-	0.3	-	-	0

Intersection	
Intersection Delay, s/veh	19.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	18	323	11	40	358	46	12	1	31	57	2	21
Future Vol, veh/h	18	323	11	40	358	46	12	1	31	57	2	21
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	23	419	14	50	448	58	13	1	35	75	3	28
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	31.2	12.3	10.8	12
HCM LOS	D	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	5%	18%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	92%	82%	97%	0%	0%	100%	0%
Vol Right, %	0%	97%	3%	0%	3%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	32	352	219	184	41	57	2	21
LT Vol	12	0	18	40	0	0	57	0	0
Through Vol	0	1	323	179	179	0	0	2	0
RT Vol	0	31	11	0	5	41	0	0	21
Lane Flow Rate	13	36	457	274	230	52	75	3	28
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.032	0.072	0.812	0.448	0.368	0.073	0.171	0.006	0.054
Departure Headway (Hd)	8.448	7.238	6.391	5.886	5.776	5.085	8.223	7.712	6.997
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	422	492	567	610	622	702	434	462	509
Service Time	6.239	5.028	4.145	3.634	3.524	2.833	6.008	5.497	4.781
HCM Lane V/C Ratio	0.031	0.073	0.806	0.449	0.37	0.074	0.173	0.006	0.055
HCM Control Delay	11.5	10.6	31.2	13.4	11.9	8.2	12.7	10.5	10.2
HCM Lane LOS	B	B	D	B	B	A	B	B	B
HCM 95th-tile Q	0.1	0.2	8	2.3	1.7	0.2	0.6	0	0.2

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	273	138	105	374	0	0	0	0	115	0	70
Future Vol, veh/h	0	273	138	105	374	0	0	0	0	115	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	329	166	117	416	0	0	0	0	120	0	73

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	495	0	0				1062	1145	208
Stage 1	-	-	-	-	-	-				650	650	-
Stage 2	-	-	-	-	-	-				412	495	-
Critical Hdwy	-	-	-	4.175	-	-				6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-				5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-				3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	1049	-	0				228	195	790
Stage 1	0	-	-	-	-	0				476	458	-
Stage 2	0	-	-	-	-	0				660	539	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1049	-	-				202	0	790
Mov Cap-2 Maneuver	-	-	-	-	-	-				202	0	-
Stage 1	-	-	-	-	-	-				476	0	-
Stage 2	-	-	-	-	-	-				586	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.9	32.3
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1049	-	202	790
HCM Lane V/C Ratio	-	-	0.111	-	0.593	0.092
HCM Control Delay (s)	-	-	8.9	-	45.9	10
HCM Lane LOS	-	-	A	-	E	B
HCM 95th %tile Q(veh)	-	-	0.4	-	3.3	0.3

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	58	330	0	0	291	98	188	1	237	0	0	0
Future Vol, veh/h	58	330	0	0	291	98	188	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	67	379	0	0	331	111	204	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	442	0	-	-	-	0	679	955	379
Stage 1	-	-	-	-	-	-	513	513	-
Stage 2	-	-	-	-	-	-	166	442	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1104	-	0	0	-	-	397	255	662
Stage 1	-	-	0	0	-	-	595	531	-
Stage 2	-	-	0	0	-	-	842	571	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1104	-	-	-	-	-	373	0	662
Mov Cap-2 Maneuver	-	-	-	-	-	-	373	0	-
Stage 1	-	-	-	-	-	-	559	0	-
Stage 2	-	-	-	-	-	-	842	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0	19.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	373	662	1104	-	-	-
HCM Lane V/C Ratio	0.551	0.389	0.06	-	-	-
HCM Control Delay (s)	25.9	13.9	8.5	-	-	-
HCM Lane LOS	D	B	A	-	-	-
HCM 95th %tile Q(veh)	3.2	1.8	0.2	-	-	-

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	216	230	121	18	175	16	88	57	19	16	42	126
Future Vol, veh/h	216	230	121	18	175	16	88	57	19	16	42	126
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	254	271	142	20	192	18	95	61	20	17	45	134
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.7	12	12.1	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	78%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	22%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	57	19	216	230	121	18	117	74	16	42
LT Vol	88	0	0	216	0	0	18	0	0	16	0
Through Vol	0	57	0	0	230	0	0	117	58	0	42
RT Vol	0	0	19	0	0	121	0	0	16	0	0
Lane Flow Rate	95	61	20	254	271	142	20	128	82	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.213	0.13	0.039	0.497	0.492	0.231	0.043	0.262	0.163	0.038	0.094
Departure Headway (Hd)	8.114	7.614	6.914	7.046	6.546	5.846	7.846	7.346	7.195	8.103	7.603
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	443	471	518	516	555	618	457	490	499	443	472
Service Time	5.85	5.35	4.65	4.746	4.246	3.546	5.58	5.08	4.929	5.838	5.338
HCM Lane V/C Ratio	0.214	0.13	0.039	0.492	0.488	0.23	0.044	0.261	0.164	0.038	0.095
HCM Control Delay	13	11.5	9.9	16.5	15.4	10.3	10.9	12.7	11.3	11.2	11.1
HCM Lane LOS	B	B	A	C	C	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.7	2.7	0.9	0.1	1	0.6	0.1	0.3

APPENDIX P

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

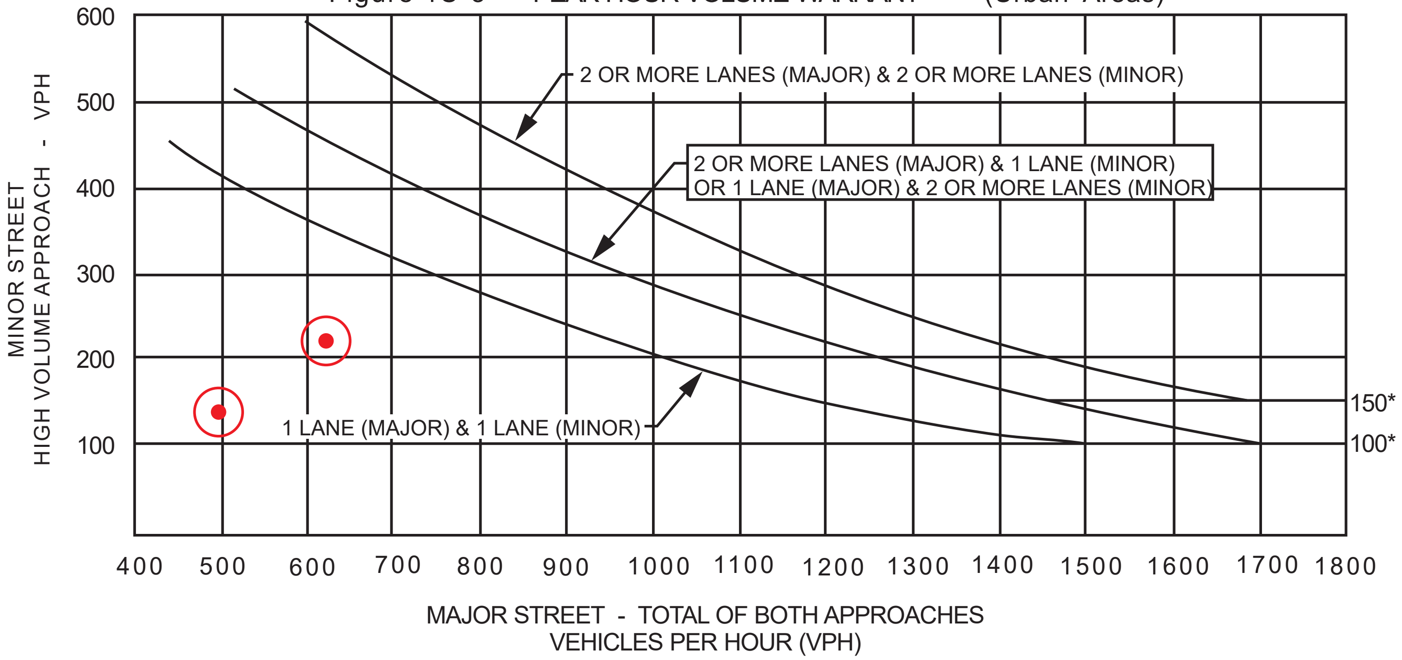
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	624	498			
Highest Approaches - Minor Street	✓		221	137			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: SEMAS Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

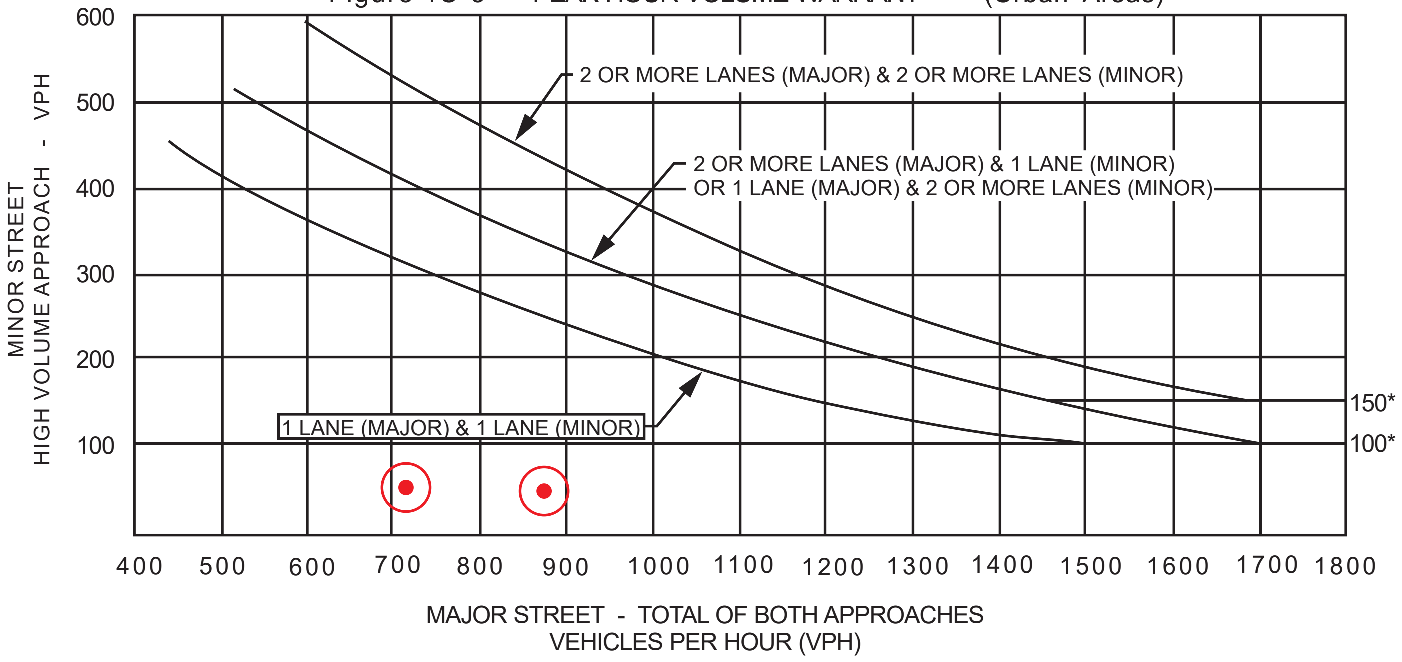
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street	✓		875	717			
Highest Approaches - Minor Street	✓		48	52			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

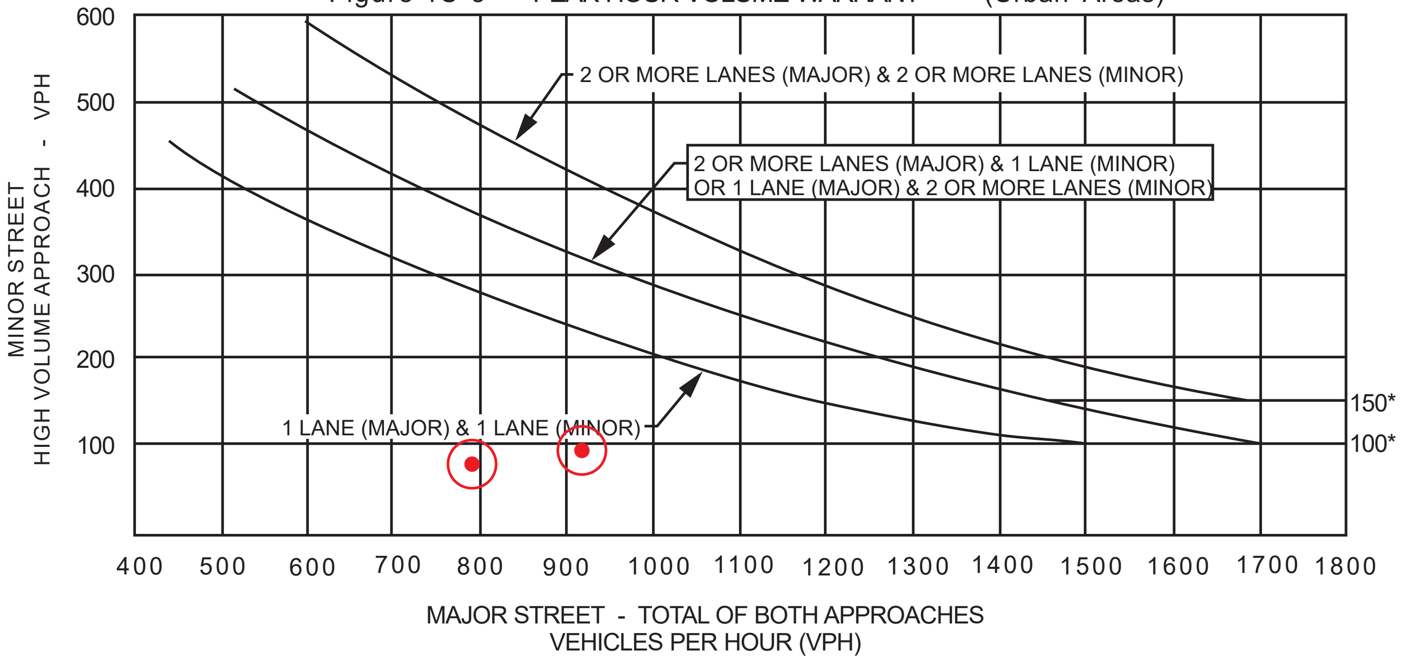
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	919	797			
Highest Approaches - Minor Street	✓		95	80			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

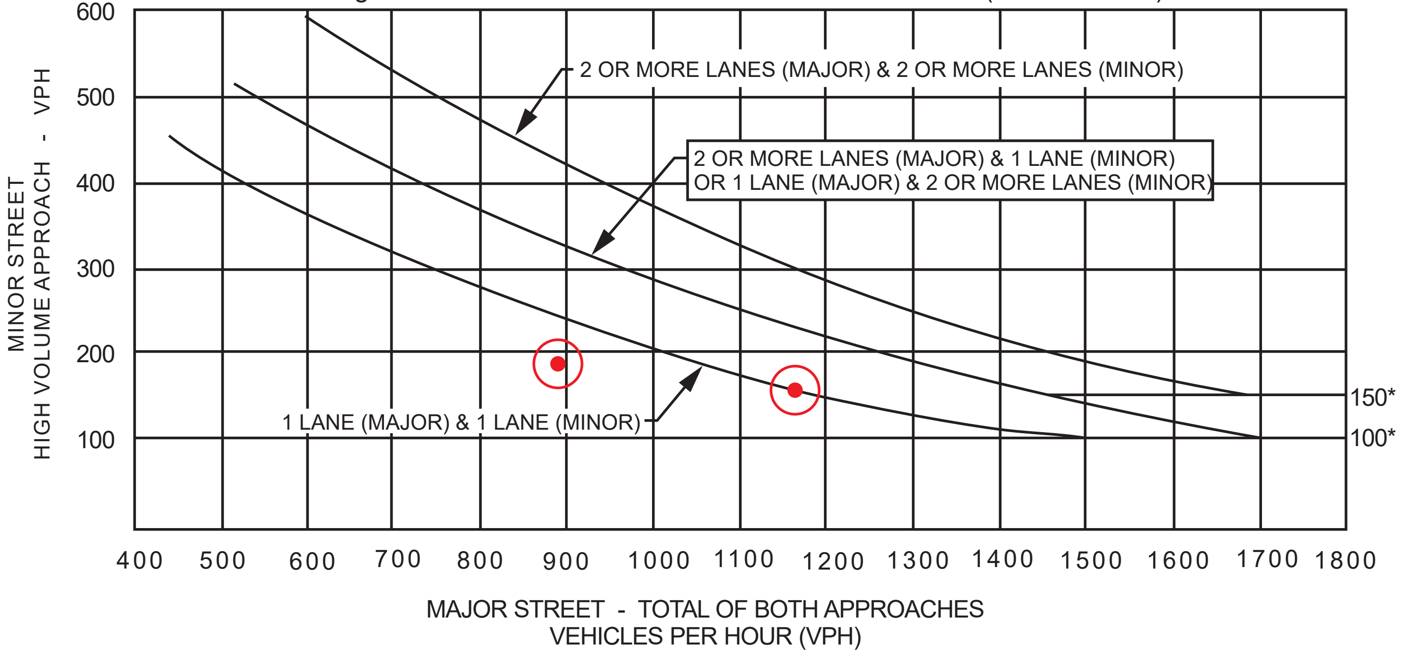
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1165	890			
Highest Approaches - Minor Street	✓		155	185			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

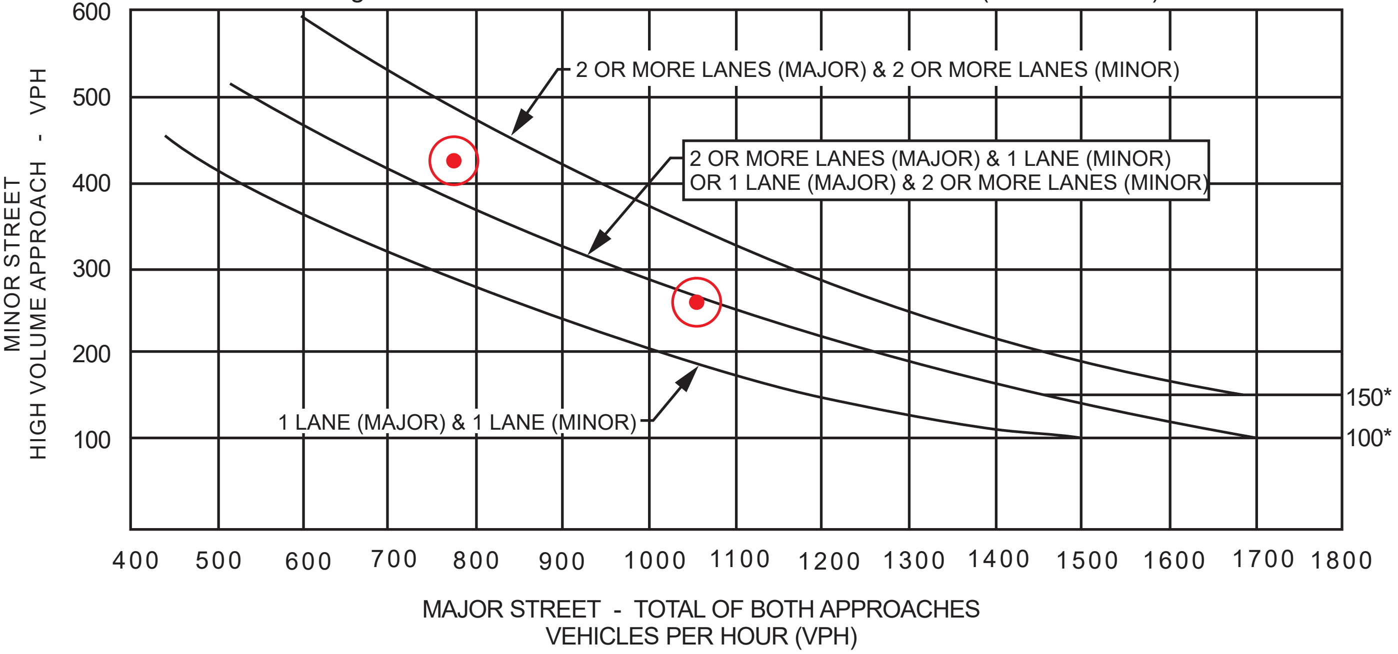
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☒ NO ☐

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1056	777			
Highest Approaches - Minor Street	✓		260	426			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

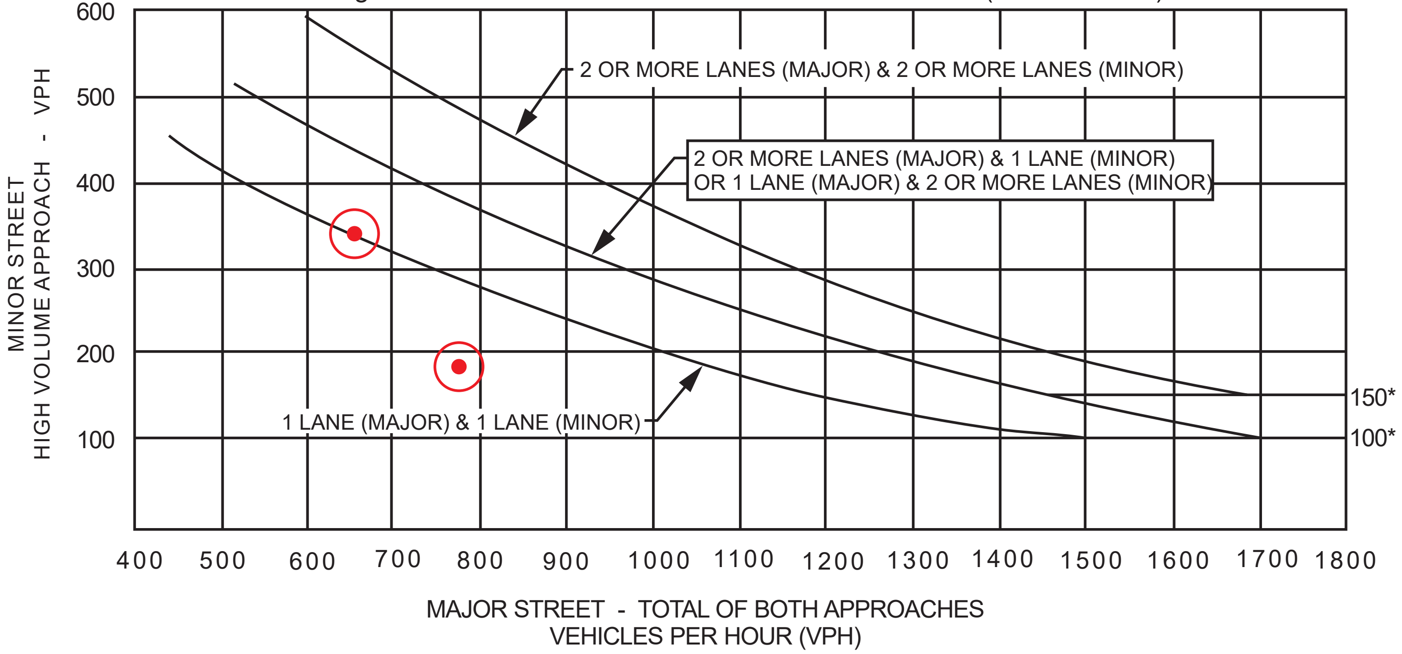
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 - 155 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	657	777			
Highest Approaches - Minor Street	✓		342	184			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX Q

MITIGATED

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 CONDITIONS

ALTERNATIVE A

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Intersection	
Int Delay, s/veh	10.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←↑↑→		↰	↑↑→			←↑	↱		←↑→	
Traffic Vol, veh/h	2	53	7	300	257	3	8	0	213	11	1	5
Future Vol, veh/h	2	53	7	300	257	3	8	0	213	11	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	394	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	58	58	58	45	45	45	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	67	9	517	443	5	18	0	473	20	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	448	0	0	76	0	0	1335	1560	38	1520	1562	224
Stage 1	-	-	-	-	-	-	78	78	-	1480	1480	-
Stage 2	-	-	-	-	-	-	1257	1482	-	40	82	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1109	-	-	1521	-	-	112	111	1026	81	111	779
Stage 1	-	-	-	-	-	-	922	829	-	132	188	-
Stage 2	-	-	-	-	-	-	181	187	-	970	826	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1109	-	-	1521	-	-	80	73	1026	32	73	779
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	73	-	32	73	-
Stage 1	-	-	-	-	-	-	919	827	-	132	124	-
Stage 2	-	-	-	-	-	-	116	123	-	521	824	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.6	13.3	171.1
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	80	1026	1109	-	-	1521	-	-	47
HCM Lane V/C Ratio	0.222	0.461	0.002	-	-	0.34	-	-	0.646
HCM Control Delay (s)	62.4	11.5	8.3	0	-	8.6	-	-	171.1
HCM Lane LOS	F	B	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	0.8	2.5	0	-	-	1.5	-	-	2.5

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 AM
2: Semas Drive & Bush Street

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✥			✥	
Traffic Vol, veh/h	0	315	10	16	534	0	9	0	39	0	0	1
Future Vol, veh/h	0	315	10	16	534	0	9	0	39	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	594	19	28	921	0	16	0	71	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	921	0	0	613	0	0	1121	1581	307	1274	1590	461
Stage 1	-	-	-	-	-	-	604	604	-	977	977	-
Stage 2	-	-	-	-	-	-	517	977	-	297	613	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	737	-	-	962	-	-	161	108	689	124	107	547
Stage 1	-	-	-	-	-	-	452	486	-	269	327	-
Stage 2	-	-	-	-	-	-	509	327	-	687	481	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	737	-	-	962	-	-	153	102	689	106	101	547
Mov Cap-2 Maneuver	-	-	-	-	-	-	153	102	-	106	101	-
Stage 1	-	-	-	-	-	-	452	486	-	269	307	-
Stage 2	-	-	-	-	-	-	477	307	-	616	481	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	15.9	11.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	416	737	-	-	962	-	-	547
HCM Lane V/C Ratio	0.21	-	-	-	0.029	-	-	0.003
HCM Control Delay (s)	15.9	0	-	-	8.9	0.3	-	11.6
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	0

3: Belle Haven & Bush Street

	↗	→	↙	←	↖	↖	↑	↘	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	45	623	33	820	74	12	68	78	64
v/c Ratio	0.26	0.94	0.19	0.71	0.12	0.07	0.09	0.42	0.07
Control Delay	37.5	50.8	24.3	19.3	0.4	33.7	0.2	40.4	0.1
Queue Delay	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	52.1	24.3	19.3	0.4	33.7	0.2	40.4	0.1
Queue Length 50th (ft)	21	244	14	135	0	6	0	37	0
Queue Length 95th (ft)	30	223	25	69	0	14	0	57	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	173	666	173	1162	602	173	768	199	934
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	8	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.95	0.19	0.71	0.12	0.07	0.09	0.39	0.07

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑	↱
Traffic Volume (veh/h)	24	318	12	20	500	45	7	0	39	52	0	43
Future Volume (veh/h)	24	318	12	20	500	45	7	0	39	52	0	43
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		0.97	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	45	600	23	33	820	74	12	0	68	78	0	64
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	111	528	20	91	1010	439	260	0	406	286	506	429
Arrive On Green	0.06	0.30	0.30	0.10	0.58	0.58	0.15	0.00	0.26	0.16	0.00	0.28
Sat Flow, veh/h	1753	1761	68	1753	3497	1521	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	45	0	623	33	820	74	12	0	68	78	0	64
Grp Sat Flow(s),veh/h/ln	1753	0	1829	1753	1749	1521	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	2.0	0.0	24.0	1.4	14.9	1.1	0.5	0.0	2.7	3.1	0.0	1.9
Cycle Q Clear(g_c), s	2.0	0.0	24.0	1.4	14.9	1.1	0.5	0.0	2.7	3.1	0.0	1.9
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	111	0	549	91	1010	439	260	0	406	286	506	429
V/C Ratio(X)	0.41	0.00	1.14	0.36	0.81	0.17	0.05	0.00	0.17	0.27	0.00	0.15
Avail Cap(c_a), veh/h	175	0	549	175	1049	456	260	0	406	286	506	429
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	28.0	34.6	15.2	4.7	29.2	0.0	22.9	29.3	0.0	12.6
Incr Delay (d2), s/veh	2.4	0.0	81.6	2.3	4.7	0.2	0.1	0.0	0.9	0.5	0.0	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	0.9	0.0	22.0	0.6	4.2	0.6	0.2	0.0	1.0	1.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.4	0.0	109.6	36.9	19.8	4.8	29.3	0.0	23.8	29.8	0.0	13.3
LnGrp LOS	D	A	F	D	B	A	C	A	C	C	A	B
Approach Vol, veh/h		668			927			80			142	
Approach Delay, s/veh		104.8			19.2			24.6			22.4	
Approach LOS		F			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	25.3	8.7	28.5	16.3	26.5	9.6	27.6
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	9.2	20.8	8.0	24.0	8.0	22.0	8.0	24.0
Max Q Clear Time (g_c+I1), s	5.1	4.7	3.4	26.0	2.5	3.9	4.0	16.9
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	3.2

Intersection Summary			
HCM 6th Ctrl Delay			51.2
HCM 6th LOS			D

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 AM
4: SR 41 SB Ramp & Bush Street

08/24/2019

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	447	259	353	579	80	130
v/c Ratio	0.84	0.41	0.83	0.28	0.16	0.24
Control Delay	17.3	1.5	45.1	4.9	24.6	6.2
Queue Delay	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	1.5	45.1	4.9	24.6	6.2
Queue Length 50th (ft)	73	0	168	21	32	0
Queue Length 95th (ft)	36	0	248	49	54	23
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	582	671	466	2234	510	543
Starvation Cap Reductn	17	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.39	0.76	0.26	0.16	0.24

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 AM

4: SR 41 SB Ramp & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	259	150	286	469	0	0	0	0	59	0	96
Future Volume (veh/h)	0	259	150	286	469	0	0	0	0	59	0	96
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	447	259	353	579	0				80	0	130
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	511	433	395	1956	0				575	0	512
Arrive On Green	0.00	0.28	0.28	0.23	0.56	0.00				0.33	0.00	0.33
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1559
Grp Volume(v), veh/h	0	447	259	353	579	0				80	0	130
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1559
Q Serve(g_s), s	0.0	18.5	11.5	15.6	7.0	0.0				2.6	0.0	4.9
Cycle Q Clear(g_c), s	0.0	18.5	11.5	15.6	7.0	0.0				2.6	0.0	4.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	511	433	395	1956	0				575	0	512
V/C Ratio(X)	0.00	0.87	0.60	0.89	0.30	0.00				0.14	0.00	0.25
Avail Cap(c_a), veh/h	0	587	497	471	2251	0				575	0	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.36	0.36	0.56	0.56	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	27.6	25.0	30.0	9.3	0.0				18.9	0.0	19.7
Incr Delay (d2), s/veh	0.0	5.1	0.6	10.6	0.0	0.0				0.5	0.0	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	0.0	8.4	4.1	7.4	2.3	0.0				1.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	32.7	25.6	40.6	9.4	0.0				19.4	0.0	20.9
LnGrp LOS	A	C	C	D	A	A				B	A	C
Approach Vol, veh/h		706			932						210	
Approach Delay, s/veh		30.1			21.2						20.3	
Approach LOS		C			C						C	

Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			22.5	26.7		30.8		49.2				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			21.5	25.5		19.5		51.5				
Max Q Clear Time (g_c+I1), s			17.6	20.5		6.9		9.0				
Green Ext Time (p_c), s			0.4	1.7		0.6		4.3				

Intersection Summary			
HCM 6th Ctrl Delay			24.5
HCM 6th LOS			C

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 AM
5: SR 41 NB Ramp & Bush Street

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	93	428	899	241	111
v/c Ratio	0.45	0.48	0.77	0.34	0.16
Control Delay	19.0	10.2	26.6	21.1	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	10.2	26.6	21.1	5.2
Queue Length 50th (ft)	29	25	193	87	0
Queue Length 95th (ft)	37	3	211	127	20
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	235	1077	1360	714	703
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.40	0.66	0.34	0.16

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 AM
5: SR 41 NB Ramp & Bush Street

08/24/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	57	261	0	0	579	158	176	2	82	0	0	0
Future Volume (veh/h)	57	261	0	0	579	158	176	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	93	428	0	0	706	193	238	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	154	853	0	0	860	235	747	9	673			
Arrive On Green	0.17	0.92	0.00	0.00	0.32	0.32	0.43	0.43	0.43			
Sat Flow, veh/h	1767	1856	0	0	2814	744	1746	22	1572			
Grp Volume(v), veh/h	93	428	0	0	457	442	241	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1703	1768	0	1572			
Q Serve(g_s), s	3.9	2.8	0.0	0.0	19.2	19.2	7.2	0.0	3.5			
Cycle Q Clear(g_c), s	3.9	2.8	0.0	0.0	19.2	19.2	7.2	0.0	3.5			
Prop In Lane	1.00		0.00	0.00		0.44	0.99		1.00			
Lane Grp Cap(c), veh/h	154	853	0	0	557	538	757	0	673			
V/C Ratio(X)	0.60	0.50	0.00	0.00	0.82	0.82	0.32	0.00	0.16			
Avail Cap(c_a), veh/h	236	1083	0	0	694	670	757	0	673			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.43	0.43	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.7	1.9	0.0	0.0	25.3	25.3	15.2	0.0	14.1			
Incr Delay (d2), s/veh	1.6	0.2	0.0	0.0	6.4	6.6	1.1	0.0	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			
%ile BackOfQ(50%),veh/ln	1.6	0.6	0.0	0.0	8.5	8.2	3.0	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	2.1	0.0	0.0	31.7	31.9	16.3	0.0	14.6			
LnGrp LOS	C	A	A	A	C	C	B	A	B			
Approach Vol, veh/h		521			899			352				
Approach Delay, s/veh		7.6			31.8			15.7				
Approach LOS		A			C			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		38.7		41.3			11.5	29.8				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		24.3		46.7			10.7	31.5				
Max Q Clear Time (g_c+I1), s		9.2		4.8			5.9	21.2				
Green Ext Time (p_c), s		1.6		2.8			0.1	4.1				

Intersection Summary			
HCM 6th Ctrl Delay			21.5
HCM 6th LOS			C

Intersection	
Intersection Delay, s/veh	27.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	103	163	77	22	244	22	192	53	19	32	59	301
Future Vol, veh/h	103	163	77	22	244	22	192	53	19	32	59	301
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	191	302	143	26	284	26	274	76	27	36	67	342
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	21.8	19.8	32.4	35.8
HCM LOS	C	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	41%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	59%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	192	53	19	103	109	131	22	163	103	32	59	301
LT Vol	192	0	0	103	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	109	54	0	163	81	0	59	0
RT Vol	0	0	19	0	0	77	0	0	22	0	0	301
Lane Flow Rate	274	76	27	191	201	243	26	189	120	36	67	342
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.766	0.201	0.067	0.505	0.505	0.582	0.073	0.513	0.321	0.1	0.176	0.831
Departure Headway (Hd)	10.048	9.548	8.848	9.527	9.027	8.616	10.257	9.757	9.608	9.949	9.449	8.749
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	359	376	404	378	398	418	349	369	374	360	379	414
Service Time	7.823	7.323	6.623	7.297	6.797	6.386	8.037	7.537	7.388	7.724	7.224	6.524
HCM Lane V/C Ratio	0.763	0.202	0.067	0.505	0.505	0.581	0.074	0.512	0.321	0.1	0.177	0.826
HCM Control Delay	39.3	14.7	12.3	21.7	20.7	22.8	13.8	22.5	16.9	13.8	14.2	42.4
HCM Lane LOS	E	B	B	C	C	C	B	C	C	B	B	E
HCM 95th-tile Q	6.2	0.7	0.2	2.7	2.8	3.6	0.2	2.8	1.4	0.3	0.6	7.8

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 PM
1: College Avenue & Bush Street

08/24/2019

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	7	174	9	140	158	9	6	0	131	9	1	3
Future Vol, veh/h	7	174	9	140	158	9	6	0	131	9	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	394	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	65	65	65	65	65	65	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	210	11	215	243	14	9	0	202	13	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	257	0	0	221	0	0	786	919	113	803	917	131
Stage 1	-	-	-	-	-	-	232	232	-	680	680	-
Stage 2	-	-	-	-	-	-	554	687	-	123	237	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1305	-	-	1345	-	-	283	270	918	275	270	894
Stage 1	-	-	-	-	-	-	750	711	-	407	449	-
Stage 2	-	-	-	-	-	-	484	446	-	868	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1305	-	-	1345	-	-	244	225	916	187	225	892
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	225	-	187	225	-
Stage 1	-	-	-	-	-	-	745	706	-	404	377	-
Stage 2	-	-	-	-	-	-	402	375	-	671	703	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	3.7	10.5	21.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	244	916	1305	-	-	1345	-	-	232
HCM Lane V/C Ratio	0.038	0.22	0.006	-	-	0.16	-	-	0.078
HCM Control Delay (s)	20.3	10	7.8	0	-	8.2	-	-	21.8
HCM Lane LOS	C	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0.8	0	-	-	0.6	-	-	0.3

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✥			✥	
Traffic Vol, veh/h	0	318	7	67	324	0	18	0	34	0	0	2
Future Vol, veh/h	0	318	7	67	324	0	18	0	34	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	413	9	103	498	0	25	0	48	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	498	0	0	422	0	0	873	1122	211	911	1126	249
Stage 1	-	-	-	-	-	-	418	418	-	704	704	-
Stage 2	-	-	-	-	-	-	455	704	-	207	422	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1062	-	-	1134	-	-	244	205	794	229	203	751
Stage 1	-	-	-	-	-	-	583	589	-	394	438	-
Stage 2	-	-	-	-	-	-	554	438	-	776	587	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1062	-	-	1134	-	-	220	179	794	194	177	751
Mov Cap-2 Maneuver	-	-	-	-	-	-	220	179	-	194	177	-
Stage 1	-	-	-	-	-	-	583	589	-	394	383	-
Stage 2	-	-	-	-	-	-	482	383	-	729	587	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.8	15.5	9.8
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	417	1062	-	-	1134	-	-	751
HCM Lane V/C Ratio	0.176	-	-	-	0.091	-	-	0.004
HCM Control Delay (s)	15.5	0	-	-	8.5	0.4	-	9.8
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.6	0	-	-	0.3	-	-	0

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	23	433	50	448	58	13	36	75	3	28
v/c Ratio	0.17	0.81	0.36	0.38	0.09	0.10	0.06	0.41	0.00	0.04
Control Delay	45.8	44.2	45.6	21.3	2.6	44.5	10.5	48.4	22.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	44.2	45.6	21.3	2.6	44.5	10.5	48.4	22.0	0.1
Queue Length 50th (ft)	14	253	33	91	0	8	0	45	1	0
Queue Length 95th (ft)	33	259	63	110	3	27	25	75	7	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	144	705	144	1367	710	137	604	195	866	796
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.61	0.35	0.33	0.08	0.09	0.06	0.38	0.00	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	18	323	11	40	358	46	12	1	31	57	2	21
Future Volume (veh/h)	18	323	11	40	358	46	12	1	31	57	2	21
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	23	419	14	50	448	58	13	1	35	75	3	28
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	65	474	16	104	1012	452	42	10	337	454	840	712
Arrive On Green	0.04	0.27	0.27	0.12	0.59	0.59	0.02	0.22	0.22	0.26	0.46	0.46
Sat Flow, veh/h	1725	1742	58	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	23	0	433	50	448	58	13	0	36	75	3	28
Grp Sat Flow(s),veh/h/ln	1725	0	1801	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	1.3	0.0	23.1	2.7	7.2	0.8	0.7	0.0	1.9	3.4	0.1	1.0
Cycle Q Clear(g_c), s	1.3	0.0	23.1	2.7	7.2	0.8	0.7	0.0	1.9	3.4	0.1	1.0
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	65	0	490	104	1012	452	42	0	347	454	840	712
V/C Ratio(X)	0.35	0.00	0.88	0.48	0.44	0.13	0.31	0.00	0.10	0.17	0.00	0.04
Avail Cap(c_a), veh/h	147	0	711	147	1359	606	140	0	347	454	840	712
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.94	0.94	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.9	0.0	34.9	42.5	16.0	3.7	48.0	0.0	30.7	28.4	14.4	14.6
Incr Delay (d2), s/veh	3.2	0.0	9.2	3.2	0.3	0.1	4.1	0.0	0.6	0.2	0.0	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	0.6	0.0	10.9	1.2	2.4	0.6	0.4	0.0	0.7	1.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	0.0	44.1	45.8	16.3	3.8	52.1	0.0	31.3	28.6	14.4	14.7
LnGrp LOS	D	A	D	D	B	A	D	A	C	C	B	B
Approach Vol, veh/h		456			556			49			106	
Approach Delay, s/veh		44.4			17.7			36.9			24.5	
Approach LOS		D			B			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.8	27.0	10.5	31.7	6.9	50.9	8.3	33.9
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	11.5	22.5	8.5	39.5	8.1	25.9	8.5	39.5
Max Q Clear Time (g_c+I1), s	5.4	3.9	4.7	25.1	2.7	3.0	3.3	9.2
Green Ext Time (p_c), s	0.1	0.1	0.0	2.1	0.0	0.1	0.0	3.3

Intersection Summary			
HCM 6th Ctrl Delay			29.5
HCM 6th LOS			C

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 PM
4: SR 41 SB Ramp & Bush Street

08/24/2019

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	329	166	117	416	120	73
v/c Ratio	0.62	0.30	0.51	0.41	0.13	0.09
Control Delay	15.9	3.0	20.8	14.1	8.3	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	3.0	20.8	14.1	8.3	3.2
Queue Length 50th (ft)	111	12	27	50	16	0
Queue Length 95th (ft)	58	13	52	67	48	18
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	778	741	337	1478	902	841
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.22	0.35	0.28	0.13	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	273	138	105	374	0	0	0	0	115	0	70
Future Volume (veh/h)	0	273	138	105	374	0	0	0	0	115	0	70
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	329	166	117	416	0				120	0	73
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	624	517	318	1185	0				832	0	740
Arrive On Green	0.00	0.34	0.34	0.34	0.34	0.00				0.48	0.00	0.48
Sat Flow, veh/h	0	1826	1513	881	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	329	166	117	416	0				120	0	73
Grp Sat Flow(s),veh/h/ln	0	1826	1513	881	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	7.2	4.1	6.2	4.5	0.0				1.9	0.0	1.3
Cycle Q Clear(g_c), s	0.0	7.2	4.1	13.4	4.5	0.0				1.9	0.0	1.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	624	517	318	1185	0				832	0	740
V/C Ratio(X)	0.00	0.53	0.32	0.37	0.35	0.00				0.14	0.00	0.10
Avail Cap(c_a), veh/h	0	785	651	395	1492	0				832	0	740
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.57	0.57	0.93	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	13.2	12.2	18.6	12.3	0.0				7.3	0.0	7.1
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.7	0.2	0.0				0.4	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	2.5	1.2	1.1	1.5	0.0				0.6	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.6	12.4	19.3	12.5	0.0				7.7	0.0	7.4
LnGrp LOS	A	B	B	B	B	A				A	A	A
Approach Vol, veh/h		495			533						193	
Approach Delay, s/veh		13.2			14.0						7.6	
Approach LOS		B			B						A	

Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				21.6		28.4		21.6				
Change Period (Y+Rc), s				4.5		4.5		4.5				
Max Green Setting (Gmax), s				21.5		19.5		21.5				
Max Q Clear Time (g_c+I1), s				9.2		3.9		15.4				
Green Ext Time (p_c), s				2.0		0.7		1.7				

Intersection Summary			
HCM 6th Ctrl Delay			12.6
HCM 6th LOS			B

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 PM
5: SR 41 NB Ramp & Bush Street

08/24/2019

	↗	→	←	↑	↱
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	67	379	442	205	258
v/c Ratio	0.24	0.66	0.39	0.23	0.28
Control Delay	7.6	15.1	10.0	9.4	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	15.1	10.0	9.4	2.7
Queue Length 50th (ft)	14	168	38	30	0
Queue Length 95th (ft)	19	144	52	78	34
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	375	785	1499	877	911
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.48	0.29	0.23	0.28

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 PM
5: SR 41 NB Ramp & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	58	330	0	0	291	98	188	1	237	0	0	0
Future Volume (veh/h)	58	330	0	0	291	98	188	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	67	379	0	0	331	111	204	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	295	500	0	0	701	231	957	5	856			
Arrive On Green	0.18	0.18	0.00	0.00	0.27	0.27	0.55	0.55	0.55			
Sat Flow, veh/h	932	1841	0	0	2676	852	1745	9	1560			
Grp Volume(v), veh/h	67	379	0	0	222	220	205	0	258			
Grp Sat Flow(s),veh/h/ln	932	1841	0	0	1749	1687	1753	0	1560			
Q Serve(g_s), s	3.4	9.8	0.0	0.0	5.3	5.5	3.0	0.0	4.5			
Cycle Q Clear(g_c), s	8.8	9.8	0.0	0.0	5.3	5.5	3.0	0.0	4.5			
Prop In Lane	1.00		0.00	0.00		0.50	1.00		1.00			
Lane Grp Cap(c), veh/h	295	500	0	0	475	458	962	0	856			
V/C Ratio(X)	0.23	0.76	0.00	0.00	0.47	0.48	0.21	0.00	0.30			
Avail Cap(c_a), veh/h	443	792	0	0	752	726	962	0	856			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.75	0.75	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.1	18.9	0.0	0.0	15.2	15.3	5.8	0.0	6.1			
Incr Delay (d2), s/veh	0.3	1.8	0.0	0.0	0.7	0.8	0.5	0.0	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			
%ile BackOfQ(50%),veh/ln	0.7	4.1	0.0	0.0	1.9	1.9	0.9	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	20.7	0.0	0.0	15.9	16.0	6.3	0.0	7.0			
LnGrp LOS	C	C	A	A	B	B	A	A	A			
Approach Vol, veh/h		446			442			463				
Approach Delay, s/veh		20.8			16.0			6.7				
Approach LOS		C			B			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		31.9		18.1				18.1				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		19.5		21.5				21.5				
Max Q Clear Time (g_c+I1), s		6.5		11.8				7.5				
Green Ext Time (p_c), s		1.8		1.8				2.2				
Intersection Summary												
HCM 6th Ctrl Delay			14.4									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	13.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	216	230	121	18	175	16	88	57	19	16	42	126
Future Vol, veh/h	216	230	121	18	175	16	88	57	19	16	42	126
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	254	271	142	20	192	18	95	61	20	17	45	134
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.1	12	12.1	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	39%	0%	100%	78%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	61%	0%	0%	22%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	57	19	216	153	198	18	117	74	16	42	126
LT Vol	88	0	0	216	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	153	77	0	117	58	0	42	0
RT Vol	0	0	19	0	0	121	0	0	16	0	0	126
Lane Flow Rate	95	61	20	254	180	233	20	128	82	17	45	134
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.213	0.13	0.039	0.497	0.328	0.395	0.043	0.261	0.163	0.038	0.094	0.257
Departure Headway (Hd)	8.107	7.607	6.907	7.045	6.545	6.116	7.84	7.34	7.19	8.095	7.595	6.895
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	444	472	519	516	552	593	458	490	500	443	473	521
Service Time	5.841	5.341	4.641	4.745	4.245	3.816	5.575	5.075	4.924	5.829	5.329	4.629
HCM Lane V/C Ratio	0.214	0.129	0.039	0.492	0.326	0.393	0.044	0.261	0.164	0.038	0.095	0.257
HCM Control Delay	13	11.5	9.9	16.5	12.4	12.8	10.9	12.7	11.3	11.1	11.1	12
HCM Lane LOS	B	B	A	C	B	B	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.7	1.4	1.9	0.1	1	0.6	0.1	0.3	1

APPENDIX R

MITIGATED

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASE 1 CONDITIONS

ALTERNATIVE B

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	79	965	491	31
Demand Flow Rate, veh/h	80	984	500	31
Vehicles Circulating, veh/h	549	21	91	997
Vehicles Exiting, veh/h	479	570	538	8
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.7	13.3	6.8	8.0
Approach LOS	A	B	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	80	984	500	31
Cap Entry Lane, veh/h	788	1351	1258	499
Entry HV Adj Factor	0.983	0.981	0.982	0.999
Flow Entry, veh/h	79	965	491	31
Cap Entry, veh/h	775	1325	1235	499
V/C Ratio	0.101	0.729	0.398	0.062
Control Delay, s/veh	5.7	13.3	6.8	8.0
LOS	A	B	A	A
95th %tile Queue, veh	0	7	2	0

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰↑↱			✥			✥	
Traffic Vol, veh/h	0	315	10	16	534	0	9	0	39	0	0	1
Future Vol, veh/h	0	315	10	16	534	0	9	0	39	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	594	19	28	921	0	16	0	71	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	921	0	0	613	0	0	1121	1581	604	1616	1590	461
Stage 1	-	-	-	-	-	-	604	604	-	977	977	-
Stage 2	-	-	-	-	-	-	517	977	-	639	613	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	739	-	-	964	-	-	172	108	497	76	107	548
Stage 1	-	-	-	-	-	-	484	487	-	270	328	-
Stage 2	-	-	-	-	-	-	510	328	-	463	482	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	739	-	-	964	-	-	164	102	497	62	101	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	164	102	-	62	101	-
Stage 1	-	-	-	-	-	-	484	487	-	270	309	-
Stage 2	-	-	-	-	-	-	478	309	-	397	482	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	18.2	11.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	360	739	-	-	964	-	-	548
HCM Lane V/C Ratio	0.242	-	-	-	0.029	-	-	0.003
HCM Control Delay (s)	18.2	0	-	-	8.8	0.2	-	11.6
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	0

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	45	623	33	820	74	12	68	78	64
v/c Ratio	0.26	0.94	0.19	0.71	0.12	0.07	0.09	0.42	0.07
Control Delay	37.5	50.8	24.3	19.3	0.4	33.7	0.2	40.4	0.1
Queue Delay	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	52.1	24.3	19.3	0.4	33.7	0.2	40.4	0.1
Queue Length 50th (ft)	21	244	14	135	0	6	0	37	0
Queue Length 95th (ft)	30	223	25	69	0	14	0	57	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	173	666	173	1162	602	173	768	199	934
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	8	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.95	0.19	0.71	0.12	0.07	0.09	0.39	0.07

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 Roundabout AM
3: Belle Haven & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	24	318	12	20	500	45	7	0	39	52	0	43
Future Volume (veh/h)	24	318	12	20	500	45	7	0	39	52	0	43
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		0.97	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	45	600	23	33	820	74	12	0	68	78	0	64
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	111	528	20	91	1010	439	260	0	406	286	506	429
Arrive On Green	0.06	0.30	0.30	0.10	0.58	0.58	0.15	0.00	0.26	0.16	0.00	0.28
Sat Flow, veh/h	1753	1761	68	1753	3497	1521	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	45	0	623	33	820	74	12	0	68	78	0	64
Grp Sat Flow(s),veh/h/ln	1753	0	1829	1753	1749	1521	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	2.0	0.0	24.0	1.4	14.9	1.1	0.5	0.0	2.7	3.1	0.0	1.9
Cycle Q Clear(g_c), s	2.0	0.0	24.0	1.4	14.9	1.1	0.5	0.0	2.7	3.1	0.0	1.9
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	111	0	549	91	1010	439	260	0	406	286	506	429
V/C Ratio(X)	0.41	0.00	1.14	0.36	0.81	0.17	0.05	0.00	0.17	0.27	0.00	0.15
Avail Cap(c_a), veh/h	175	0	549	175	1049	456	260	0	406	286	506	429
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	28.0	34.6	15.2	4.7	29.2	0.0	22.9	29.3	0.0	12.6
Incr Delay (d2), s/veh	2.4	0.0	81.6	2.3	4.7	0.2	0.1	0.0	0.9	0.5	0.0	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	0.9	0.0	22.0	0.6	4.2	0.6	0.2	0.0	1.0	1.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.4	0.0	109.6	36.9	19.8	4.8	29.3	0.0	23.8	29.8	0.0	13.3
LnGrp LOS	D	A	F	D	B	A	C	A	C	C	A	B
Approach Vol, veh/h		668			927			80			142	
Approach Delay, s/veh		104.8			19.2			24.6			22.4	
Approach LOS		F			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.5	25.3	8.7	28.5	16.3	26.5	9.6	27.6
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	9.2	20.8	8.0	24.0	8.0	22.0	8.0	24.0
Max Q Clear Time (g_c+I1), s	5.1	4.7	3.4	26.0	2.5	3.9	4.0	16.9
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	3.2

Intersection Summary			
HCM 6th Ctrl Delay			51.2
HCM 6th LOS			D

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	447	259	353	579	80	130
v/c Ratio	0.84	0.41	0.83	0.28	0.16	0.24
Control Delay	17.3	1.5	45.1	4.9	24.6	6.2
Queue Delay	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	1.5	45.1	4.9	24.6	6.2
Queue Length 50th (ft)	73	0	168	21	32	0
Queue Length 95th (ft)	36	0	248	49	54	23
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	582	671	466	2234	510	543
Starvation Cap Reductn	17	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.39	0.76	0.26	0.16	0.24

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 Roundabout AM
4: SR 41 SB Ramp & Bush Street

08/24/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	259	150	286	469	0	0	0	0	59	0	96
Future Volume (veh/h)	0	259	150	286	469	0	0	0	0	59	0	96
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	447	259	353	579	0				80	0	130
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	511	433	395	1956	0				575	0	512
Arrive On Green	0.00	0.28	0.28	0.23	0.56	0.00				0.33	0.00	0.33
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1559
Grp Volume(v), veh/h	0	447	259	353	579	0				80	0	130
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1559
Q Serve(g_s), s	0.0	18.5	11.5	15.6	7.0	0.0				2.6	0.0	4.9
Cycle Q Clear(g_c), s	0.0	18.5	11.5	15.6	7.0	0.0				2.6	0.0	4.9
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	511	433	395	1956	0				575	0	512
V/C Ratio(X)	0.00	0.87	0.60	0.89	0.30	0.00				0.14	0.00	0.25
Avail Cap(c_a), veh/h	0	587	497	471	2251	0				575	0	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.36	0.36	0.56	0.56	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	27.6	25.0	30.0	9.3	0.0				18.9	0.0	19.7
Incr Delay (d2), s/veh	0.0	5.1	0.6	10.6	0.0	0.0				0.5	0.0	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	0.0	8.4	4.1	7.4	2.3	0.0				1.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	32.7	25.6	40.6	9.4	0.0				19.4	0.0	20.9
LnGrp LOS	A	C	C	D	A	A				B	A	C
Approach Vol, veh/h		706			932						210	
Approach Delay, s/veh		30.1			21.2						20.3	
Approach LOS		C			C						C	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			22.5	26.7		30.8		49.2				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			21.5	25.5		19.5		51.5				
Max Q Clear Time (g_c+I1), s			17.6	20.5		6.9		9.0				
Green Ext Time (p_c), s			0.4	1.7		0.6		4.3				
Intersection Summary												
HCM 6th Ctrl Delay			24.5									
HCM 6th LOS			C									

	↗	→	←	↑	↱
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	93	428	899	241	111
v/c Ratio	0.45	0.48	0.77	0.34	0.16
Control Delay	19.0	10.2	26.6	21.1	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	10.2	26.6	21.1	5.2
Queue Length 50th (ft)	29	25	193	87	0
Queue Length 95th (ft)	37	3	211	127	20
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	235	1077	1360	714	703
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.40	0.66	0.34	0.16

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	57	261	0	0	579	158	176	2	82	0	0	0
Future Volume (veh/h)	57	261	0	0	579	158	176	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	93	428	0	0	706	193	238	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	154	853	0	0	860	235	747	9	673			
Arrive On Green	0.17	0.92	0.00	0.00	0.32	0.32	0.43	0.43	0.43			
Sat Flow, veh/h	1767	1856	0	0	2814	744	1746	22	1572			
Grp Volume(v), veh/h	93	428	0	0	457	442	241	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1703	1768	0	1572			
Q Serve(g_s), s	3.9	2.8	0.0	0.0	19.2	19.2	7.2	0.0	3.5			
Cycle Q Clear(g_c), s	3.9	2.8	0.0	0.0	19.2	19.2	7.2	0.0	3.5			
Prop In Lane	1.00		0.00	0.00		0.44	0.99		1.00			
Lane Grp Cap(c), veh/h	154	853	0	0	557	538	757	0	673			
V/C Ratio(X)	0.60	0.50	0.00	0.00	0.82	0.82	0.32	0.00	0.16			
Avail Cap(c_a), veh/h	236	1083	0	0	694	670	757	0	673			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.43	0.43	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.7	1.9	0.0	0.0	25.3	25.3	15.2	0.0	14.1			
Incr Delay (d2), s/veh	1.6	0.2	0.0	0.0	6.4	6.6	1.1	0.0	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			
%ile BackOfQ(50%),veh/ln	1.6	0.6	0.0	0.0	8.5	8.2	3.0	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	2.1	0.0	0.0	31.7	31.9	16.3	0.0	14.6			
LnGrp LOS	C	A	A	A	C	C	B	A	B			
Approach Vol, veh/h		521			899			352				
Approach Delay, s/veh		7.6			31.8			15.7				
Approach LOS		A			C			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		38.7		41.3			11.5	29.8				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		24.3		46.7			10.7	31.5				
Max Q Clear Time (g_c+I1), s		9.2		4.8			5.9	21.2				
Green Ext Time (p_c), s		1.6		2.8			0.1	4.1				
Intersection Summary												
HCM 6th Ctrl Delay			21.5									
HCM 6th LOS			C									

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	27.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	103	163	77	22	244	22	192	53	19	32	59	301
Future Vol, veh/h	103	163	77	22	244	22	192	53	19	32	59	301
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	191	302	143	26	284	26	274	76	27	36	67	342
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	21.8	19.8	32.4	35.8
HCM LOS	C	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	41%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	59%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	192	53	19	103	109	131	22	163	103	32	59	301
LT Vol	192	0	0	103	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	109	54	0	163	81	0	59	0
RT Vol	0	0	19	0	0	77	0	0	22	0	0	301
Lane Flow Rate	274	76	27	191	201	243	26	189	120	36	67	342
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.766	0.201	0.067	0.505	0.505	0.582	0.073	0.513	0.321	0.1	0.176	0.831
Departure Headway (Hd)	10.048	9.548	8.848	9.527	9.027	8.616	10.257	9.757	9.608	9.949	9.449	8.749
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	359	376	404	378	398	418	349	369	374	360	379	414
Service Time	7.823	7.323	6.623	7.297	6.797	6.386	8.037	7.537	7.388	7.724	7.224	6.524
HCM Lane V/C Ratio	0.763	0.202	0.067	0.505	0.505	0.581	0.074	0.512	0.321	0.1	0.177	0.826
HCM Control Delay	39.3	14.7	12.3	21.7	20.7	22.8	13.8	22.5	16.9	13.8	14.2	42.4
HCM Lane LOS	E	B	B	C	C	C	B	C	C	B	B	E
HCM 95th-tile Q	6.2	0.7	0.2	2.7	2.8	3.6	0.2	2.8	1.4	0.3	0.6	7.8

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 Roundabout PM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Intersection Delay, s/veh	5.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	229	472	211	18
Demand Flow Rate, veh/h	233	481	215	18
Vehicles Circulating, veh/h	233	17	235	476
Vehicles Exiting, veh/h	261	433	231	22
Ped Vol Crossing Leg, #/h	2	2	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.4	6.0	5.2	4.4
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	233	481	215	18
Cap Entry Lane, veh/h	1088	1356	1086	849
Entry HV Adj Factor	0.982	0.982	0.981	0.999
Flow Entry, veh/h	229	472	211	18
Cap Entry, veh/h	1068	1331	1066	848
V/C Ratio	0.214	0.355	0.198	0.021
Control Delay, s/veh	5.4	6.0	5.2	4.4
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	0

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	318	7	67	324	0	18	0	34	0	0	2
Future Vol, veh/h	0	318	7	67	324	0	18	0	34	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	413	9	103	498	0	25	0	48	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	498	0	0	422	0	0	873	1122	418	1146	1126	249
Stage 1	-	-	-	-	-	-	418	418	-	704	704	-
Stage 2	-	-	-	-	-	-	455	704	-	442	422	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1064	-	-	1135	-	-	257	205	634	165	204	752
Stage 1	-	-	-	-	-	-	612	590	-	395	439	-
Stage 2	-	-	-	-	-	-	555	439	-	594	587	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1064	-	-	1135	-	-	231	179	634	138	178	752
Mov Cap-2 Maneuver	-	-	-	-	-	-	231	179	-	138	178	-
Stage 1	-	-	-	-	-	-	612	590	-	395	384	-
Stage 2	-	-	-	-	-	-	483	384	-	549	587	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.8	16.2	9.8
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	395	1064	-	-	1135	-	-	752
HCM Lane V/C Ratio	0.185	-	-	-	0.091	-	-	0.004
HCM Control Delay (s)	16.2	0	-	-	8.5	0.4	-	9.8
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.7	0	-	-	0.3	-	-	0

	↗	→	↙	←	↖	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	23	433	50	448	58	13	36	75	3	28
v/c Ratio	0.17	0.81	0.36	0.38	0.09	0.10	0.06	0.41	0.00	0.04
Control Delay	45.8	44.2	45.6	21.3	2.6	44.5	10.5	48.4	22.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	44.2	45.6	21.3	2.6	44.5	10.5	48.4	22.0	0.1
Queue Length 50th (ft)	14	253	33	91	0	8	0	45	1	0
Queue Length 95th (ft)	33	259	63	110	3	27	25	75	7	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	144	705	144	1367	710	137	604	195	866	796
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.61	0.35	0.33	0.08	0.09	0.06	0.38	0.00	0.04

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 1 Roundabout PM

3: Belle Haven & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑	↱
Traffic Volume (veh/h)	18	323	11	40	358	46	12	1	31	57	2	21
Future Volume (veh/h)	18	323	11	40	358	46	12	1	31	57	2	21
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	23	419	14	50	448	58	13	1	35	75	3	28
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	65	474	16	104	1012	452	42	10	337	454	840	712
Arrive On Green	0.04	0.27	0.27	0.12	0.59	0.59	0.02	0.22	0.22	0.26	0.46	0.46
Sat Flow, veh/h	1725	1742	58	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	23	0	433	50	448	58	13	0	36	75	3	28
Grp Sat Flow(s),veh/h/ln	1725	0	1801	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	1.3	0.0	23.1	2.7	7.2	0.8	0.7	0.0	1.9	3.4	0.1	1.0
Cycle Q Clear(g_c), s	1.3	0.0	23.1	2.7	7.2	0.8	0.7	0.0	1.9	3.4	0.1	1.0
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	65	0	490	104	1012	452	42	0	347	454	840	712
V/C Ratio(X)	0.35	0.00	0.88	0.48	0.44	0.13	0.31	0.00	0.10	0.17	0.00	0.04
Avail Cap(c_a), veh/h	147	0	711	147	1359	606	140	0	347	454	840	712
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.94	0.94	0.94	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.9	0.0	34.9	42.5	16.0	3.7	48.0	0.0	30.7	28.4	14.4	14.6
Incr Delay (d2), s/veh	3.2	0.0	9.2	3.2	0.3	0.1	4.1	0.0	0.6	0.2	0.0	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	0.6	0.0	10.9	1.2	2.4	0.6	0.4	0.0	0.7	1.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	0.0	44.1	45.8	16.3	3.8	52.1	0.0	31.3	28.6	14.4	14.7
LnGrp LOS	D	A	D	D	B	A	D	A	C	C	B	B
Approach Vol, veh/h		456			556			49			106	
Approach Delay, s/veh		44.4			17.7			36.9			24.5	
Approach LOS		D			B			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.8	27.0	10.5	31.7	6.9	50.9	8.3	33.9
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	11.5	22.5	8.5	39.5	8.1	25.9	8.5	39.5
Max Q Clear Time (g_c+I1), s	5.4	3.9	4.7	25.1	2.7	3.0	3.3	9.2
Green Ext Time (p_c), s	0.1	0.1	0.0	2.1	0.0	0.1	0.0	3.3

Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C

4: SR 41 SB Ramp & Bush Street

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	329	166	117	416	120	73
v/c Ratio	0.62	0.30	0.51	0.41	0.13	0.09
Control Delay	15.9	3.0	20.8	14.1	8.3	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	3.0	20.8	14.1	8.3	3.2
Queue Length 50th (ft)	111	12	27	50	16	0
Queue Length 95th (ft)	58	13	52	67	48	18
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	778	741	337	1478	902	841
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.22	0.35	0.28	0.13	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	273	138	105	374	0	0	0	0	115	0	70
Future Volume (veh/h)	0	273	138	105	374	0	0	0	0	115	0	70
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	329	166	117	416	0				120	0	73
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	624	517	318	1185	0				832	0	740
Arrive On Green	0.00	0.34	0.34	0.34	0.34	0.00				0.48	0.00	0.48
Sat Flow, veh/h	0	1826	1513	881	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	329	166	117	416	0				120	0	73
Grp Sat Flow(s),veh/h/ln	0	1826	1513	881	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	7.2	4.1	6.2	4.5	0.0				1.9	0.0	1.3
Cycle Q Clear(g_c), s	0.0	7.2	4.1	13.4	4.5	0.0				1.9	0.0	1.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	624	517	318	1185	0				832	0	740
V/C Ratio(X)	0.00	0.53	0.32	0.37	0.35	0.00				0.14	0.00	0.10
Avail Cap(c_a), veh/h	0	785	651	395	1492	0				832	0	740
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.57	0.57	0.93	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	13.2	12.2	18.6	12.3	0.0				7.3	0.0	7.1
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.7	0.2	0.0				0.4	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	2.5	1.2	1.1	1.5	0.0				0.6	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.6	12.4	19.3	12.5	0.0				7.7	0.0	7.4
LnGrp LOS	A	B	B	B	B	A				A	A	A
Approach Vol, veh/h		495			533						193	
Approach Delay, s/veh		13.2			14.0						7.6	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				21.6		28.4		21.6				
Change Period (Y+Rc), s				4.5		4.5		4.5				
Max Green Setting (Gmax), s				21.5		19.5		21.5				
Max Q Clear Time (g_c+I1), s				9.2		3.9		15.4				
Green Ext Time (p_c), s				2.0		0.7		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			12.6									
HCM 6th LOS			B									

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	67	379	442	205	258
v/c Ratio	0.24	0.66	0.39	0.23	0.28
Control Delay	7.6	15.1	10.0	9.4	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	15.1	10.0	9.4	2.7
Queue Length 50th (ft)	14	168	38	30	0
Queue Length 95th (ft)	19	144	52	78	34
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	375	785	1499	877	911
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.48	0.29	0.23	0.28

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	58	330	0	0	291	98	188	1	237	0	0	0
Future Volume (veh/h)	58	330	0	0	291	98	188	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	67	379	0	0	331	111	204	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	295	500	0	0	701	231	957	5	856			
Arrive On Green	0.18	0.18	0.00	0.00	0.27	0.27	0.55	0.55	0.55			
Sat Flow, veh/h	932	1841	0	0	2676	852	1745	9	1560			
Grp Volume(v), veh/h	67	379	0	0	222	220	205	0	258			
Grp Sat Flow(s),veh/h/ln	932	1841	0	0	1749	1687	1753	0	1560			
Q Serve(g_s), s	3.4	9.8	0.0	0.0	5.3	5.5	3.0	0.0	4.5			
Cycle Q Clear(g_c), s	8.8	9.8	0.0	0.0	5.3	5.5	3.0	0.0	4.5			
Prop In Lane	1.00		0.00	0.00		0.50	1.00		1.00			
Lane Grp Cap(c), veh/h	295	500	0	0	475	458	962	0	856			
V/C Ratio(X)	0.23	0.76	0.00	0.00	0.47	0.48	0.21	0.00	0.30			
Avail Cap(c_a), veh/h	443	792	0	0	752	726	962	0	856			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.75	0.75	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.1	18.9	0.0	0.0	15.2	15.3	5.8	0.0	6.1			
Incr Delay (d2), s/veh	0.3	1.8	0.0	0.0	0.7	0.8	0.5	0.0	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			
%ile BackOfQ(50%),veh/ln	0.7	4.1	0.0	0.0	1.9	1.9	0.9	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	20.7	0.0	0.0	15.9	16.0	6.3	0.0	7.0			
LnGrp LOS	C	C	A	A	B	B	A	A	A			
Approach Vol, veh/h		446			442			463				
Approach Delay, s/veh		20.8			16.0			6.7				
Approach LOS		C			B			A				

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		31.9		18.1				18.1				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		19.5		21.5				21.5				
Max Q Clear Time (g_c+I1), s		6.5		11.8				7.5				
Green Ext Time (p_c), s		1.8		1.8				2.2				

Intersection Summary			
HCM 6th Ctrl Delay			14.4
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	216	230	121	18	175	16	88	57	19	16	42	126
Future Vol, veh/h	216	230	121	18	175	16	88	57	19	16	42	126
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	254	271	142	20	192	18	95	61	20	17	45	134
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.7	12	12.1	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	78%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	22%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	57	19	216	230	121	18	117	74	16	42	126
LT Vol	88	0	0	216	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	230	0	0	117	58	0	42	0
RT Vol	0	0	19	0	0	121	0	0	16	0	0	126
Lane Flow Rate	95	61	20	254	271	142	20	128	82	17	45	134
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.213	0.13	0.039	0.497	0.492	0.231	0.043	0.262	0.163	0.038	0.094	0.257
Departure Headway (Hd)	8.114	7.614	6.914	7.046	6.546	5.846	7.846	7.346	7.195	8.103	7.603	6.903
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	443	471	518	516	555	618	457	490	499	443	472	521
Service Time	5.85	5.35	4.65	4.746	4.246	3.546	5.58	5.08	4.929	5.838	5.338	4.638
HCM Lane V/C Ratio	0.214	0.13	0.039	0.492	0.488	0.23	0.044	0.261	0.164	0.038	0.095	0.257
HCM Control Delay	13	11.5	9.9	16.5	15.4	10.3	10.9	12.7	11.3	11.2	11.1	12
HCM Lane LOS	B	B	A	C	C	B	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.7	2.7	0.9	0.1	1	0.6	0.1	0.3	1

APPENDIX S

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Existing + Approved/Pending/Proposed + Project Phase 2 AM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	20.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱			✥			✥	
Traffic Vol, veh/h	2	54	8	306	258	3	9	0	236	11	1	5
Future Vol, veh/h	2	54	8	306	258	3	9	0	236	11	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	58	58	58	45	45	45	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	68	10	528	445	5	20	0	524	20	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	450	0	0	78	0	0	1583	1580	68	1845	1588	448
Stage 1	-	-	-	-	-	-	74	74	-	1504	1504	-
Stage 2	-	-	-	-	-	-	1509	1506	-	341	84	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1110	-	-	1520	-	-	88	109	995	57	108	611
Stage 1	-	-	-	-	-	-	935	833	-	151	184	-
Stage 2	-	-	-	-	-	-	150	184	-	674	825	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1110	-	-	1520	-	-	62	71	995	20	70	611
Mov Cap-2 Maneuver	-	-	-	-	-	-	62	71	-	20	70	-
Stage 1	-	-	-	-	-	-	932	831	-	151	120	-
Stage 2	-	-	-	-	-	-	95	120	-	318	823	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.7	34.1	$ 361.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	641	1110	-	-	1520	-	-	30
HCM Lane V/C Ratio	0.849	0.002	-	-	0.347	-	-	1.012
HCM Control Delay (s)	34.1	8.3	0	-	8.6	-	-	$ 361.5
HCM Lane LOS	D	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	9.5	0	-	-	1.6	-	-	3.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

2: Semas Drive & Bush Street

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	337	12	26	538	0	12	0	66	0	0	1
Future Vol, veh/h	0	337	12	26	538	0	12	0	66	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	636	23	45	928	0	22	0	120	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	928	0	0	659	0	0	1667	1666	648	1726	1677	928
Stage 1	-	-	-	-	-	-	648	648	-	1018	1018	-
Stage 2	-	-	-	-	-	-	1019	1018	-	708	659	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	737	-	-	929	-	-	77	97	470	70	95	325
Stage 1	-	-	-	-	-	-	459	466	-	286	315	-
Stage 2	-	-	-	-	-	-	286	315	-	426	461	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	737	-	-	929	-	-	71	87	470	48	86	325
Mov Cap-2 Maneuver	-	-	-	-	-	-	71	87	-	48	86	-
Stage 1	-	-	-	-	-	-	459	466	-	286	284	-
Stage 2	-	-	-	-	-	-	256	284	-	317	461	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	36.2	16.1
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	252	737	-	-	929	-	-	325
HCM Lane V/C Ratio	0.563	-	-	-	0.048	-	-	0.006
HCM Control Delay (s)	36.2	0	-	-	9.1	0	-	16.1
HCM Lane LOS	E	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	3.1	0	-	-	0.2	-	-	0

Intersection	
Intersection Delay, s/veh	134.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰↑↱	↱	↰	↱		↰	↑	↱
Traffic Vol, veh/h	26	363	14	20	512	45	8	0	39	52	0	44
Future Vol, veh/h	26	363	14	20	512	45	8	0	39	52	0	44
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	49	685	26	33	839	74	14	0	68	78	0	66
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	301.2	28.8	14.4	15
HCM LOS	F	D	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	6%	7%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	90%	93%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	3%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	39	403	276	261	41	52	0	44
LT Vol	8	0	26	20	0	0	52	0	0
Through Vol	0	0	363	256	256	0	0	0	0
RT Vol	0	39	14	0	5	41	0	0	44
Lane Flow Rate	14	68	760	452	427	66	78	0	66
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.038	0.161	1.604	0.801	0.75	0.104	0.202	0	0.149
Departure Headway (Hd)	11.064	9.798	7.595	7.064	7.015	6.307	10.691	10.166	9.43
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	326	369	479	516	521	572	338	0	383
Service Time	8.764	7.498	5.37	4.764	4.715	4.007	8.391	7.866	7.13
HCM Lane V/C Ratio	0.043	0.184	1.587	0.876	0.82	0.115	0.231	0	0.172
HCM Control Delay	14.2	14.4	301.2	32.5	27.8	9.7	16.1	12.9	13.8
HCM Lane LOS	B	B	F	D	D	A	C	N	B
HCM 95th-tile Q	0.1	0.6	42.1	7.6	6.4	0.3	0.7	0	0.5

Intersection	
Int Delay, s/veh	35.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	290	164	286	479	0	0	0	0	59	0	98
Future Vol, veh/h	0	290	164	286	479	0	0	0	0	59	0	98
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	500	283	353	591	0	0	0	0	80	0	132

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	783	0	0				1940	2080	297
Stage 1	-	-	-	-	-	-				1297	1297	-
Stage 2	-	-	-	-	-	-				643	783	-
Critical Hdwy	-	-	-	4.16	-	-				6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-				5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-				3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	822	-	0				~ 63	52	695
Stage 1	0	-	-	-	-	0				218	228	-
Stage 2	0	-	-	-	-	0				518	400	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	822	-	-				~ 36	0	694
Mov Cap-2 Maneuver	-	-	-	-	-	-				~ 36	0	-
Stage 1	-	-	-	-	-	-				218	0	-
Stage 2	-	-	-	-	-	-				296	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	4.7	$ 306.2
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	822	-	36	694
HCM Lane V/C Ratio	-	-	0.43	-	2.215	0.191
HCM Control Delay (s)	-	-	12.6	-	$ 795.9	11.4
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	2.2	-	8.8	0.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

5: SR 41 NB Ramp & Bush Street

Intersection	
Int Delay, s/veh	24.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	66	283	0	0	585	158	180	2	82	0	0	0
Future Vol, veh/h	66	283	0	0	585	158	180	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	108	464	0	0	713	193	243	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	906	0	-	-	-	0	1037	1586	464
Stage 1	-	-	-	-	-	-	680	680	-
Stage 2	-	-	-	-	-	-	357	906	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	744	-	0	0	-	-	~ 240	107	595
Stage 1	-	-	0	0	-	-	500	448	-
Stage 2	-	-	0	0	-	-	677	352	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	744	-	-	-	-	-	~ 205	0	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 205	0	-
Stage 1	-	-	-	-	-	-	428	0	-
Stage 2	-	-	-	-	-	-	677	0	-

Approach	EB	WB	NB
HCM Control Delay, s	2	0	124.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	205	595	744	-	-	-
HCM Lane V/C Ratio	1.2	0.186	0.145	-	-	-
HCM Control Delay (s)	174.7	12.4	10.7	-	-	-
HCM Lane LOS	F	B	B	-	-	-
HCM 95th %tile Q(veh)	12.5	0.7	0.5	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Existing + Approved/Pending/Proposed + Project Phase 2 AM
6: 19 1/2 Avenue & Bush Street

08/24/2019

Intersection	
Intersection Delay, s/veh	32.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	104	181	80	22	248	22	193	53	19	32	59	302
Future Vol, veh/h	104	181	80	22	248	22	193	53	19	32	59	302
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	193	335	148	26	288	26	276	76	27	36	67	343
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	32.9	20.8	34.8	39.1
HCM LOS	D	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	193	53	19	104	181	80	22	165	105	32	59
LT Vol	193	0	0	104	0	0	22	0	0	32	0
Through Vol	0	53	0	0	181	0	0	165	83	0	59
RT Vol	0	0	19	0	0	80	0	0	22	0	0
Lane Flow Rate	276	76	27	193	335	148	26	192	122	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.787	0.205	0.068	0.516	0.851	0.347	0.074	0.533	0.332	0.103	0.18
Departure Headway (Hd)	10.27	9.77	9.07	9.637	9.137	8.437	10.473	9.973	9.826	10.169	9.669
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	353	366	394	374	396	425	341	361	365	352	370
Service Time	8.056	7.556	6.856	7.413	6.913	6.213	8.262	7.762	7.614	7.95	7.45
HCM Lane V/C Ratio	0.782	0.208	0.069	0.516	0.846	0.348	0.076	0.532	0.334	0.102	0.181
HCM Control Delay	42.4	15.1	12.5	22.3	46.6	15.7	14.1	23.7	17.5	14.1	14.6
HCM Lane LOS	E	C	B	C	E	C	B	C	C	B	B
HCM 95th-tile Q	6.5	0.8	0.2	2.8	8.1	1.5	0.2	3	1.4	0.3	0.6

1: College Avenue & Bush Street

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱			✥			✥	
Traffic Vol, veh/h	7	175	10	158	159	9	7	0	137	9	1	3
Future Vol, veh/h	7	175	10	158	159	9	7	0	137	9	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	65	65	65	65	65	65	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	211	12	243	245	14	11	0	211	13	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	223	0	0	970	972	213	1079	977	254
Stage 1	-	-	-	-	-	-	227	227	-	738	738	-
Stage 2	-	-	-	-	-	-	743	745	-	341	239	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1306	-	-	1346	-	-	233	252	827	196	251	785
Stage 1	-	-	-	-	-	-	776	716	-	410	424	-
Stage 2	-	-	-	-	-	-	407	421	-	674	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1306	-	-	1346	-	-	197	205	825	125	204	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	197	205	-	125	204	-
Stage 1	-	-	-	-	-	-	771	711	-	407	347	-
Stage 2	-	-	-	-	-	-	330	345	-	497	703	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4	12.3	30.2
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	714	1306	-	-	1346	-	-	161
HCM Lane V/C Ratio	0.31	0.006	-	-	0.181	-	-	0.112
HCM Control Delay (s)	12.3	7.8	0	-	8.3	-	-	30.2
HCM Lane LOS	B	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	1.3	0	-	-	0.7	-	-	0.4

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	323	9	114	340	0	21	0	58	0	0	2
Future Vol, veh/h	0	323	9	114	340	0	21	0	58	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	419	12	175	523	0	30	0	82	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	523	0	0	431	0	0	1300	1298	425	1339	1304	523
Stage 1	-	-	-	-	-	-	425	425	-	873	873	-
Stage 2	-	-	-	-	-	-	875	873	-	466	431	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1043	-	-	1129	-	-	138	162	629	130	160	554
Stage 1	-	-	-	-	-	-	607	586	-	345	368	-
Stage 2	-	-	-	-	-	-	344	368	-	577	583	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1043	-	-	1129	-	-	114	127	629	94	125	554
Mov Cap-2 Maneuver	-	-	-	-	-	-	114	127	-	94	125	-
Stage 1	-	-	-	-	-	-	607	586	-	345	287	-
Stage 2	-	-	-	-	-	-	267	287	-	502	583	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.2	25.4	11.5
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	286	1043	-	-	1129	-	-	554
HCM Lane V/C Ratio	0.389	-	-	-	0.155	-	-	0.005
HCM Control Delay (s)	25.4	0	-	-	8.8	0	-	11.5
HCM Lane LOS	D	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	1.8	0	-	-	0.5	-	-	0

Intersection	
Intersection Delay, s/veh	25.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑ ↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	19	351	11	40	418	46	13	1	31	57	2	23
Future Vol, veh/h	19	351	11	40	418	46	13	1	31	57	2	23
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	25	456	14	50	523	58	15	1	35	75	3	30
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	44.1	13.7	11.3	12.5
HCM LOS	E	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	5%	16%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	92%	84%	98%	0%	0%	100%	0%
Vol Right, %	0%	97%	3%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	32	381	249	214	41	57	2	23
LT Vol	13	0	19	40	0	0	57	0	0
Through Vol	0	1	351	209	209	0	0	2	0
RT Vol	0	31	11	0	5	41	0	0	23
Lane Flow Rate	15	36	495	311	267	52	75	3	30
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.036	0.077	0.904	0.518	0.437	0.075	0.18	0.006	0.062
Departure Headway (Hd)	8.912	7.696	6.579	5.989	5.892	5.198	8.662	8.148	7.43
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	404	468	549	598	609	685	417	442	485
Service Time	6.616	5.4	4.355	3.756	3.66	2.965	6.364	5.85	5.132
HCM Lane V/C Ratio	0.037	0.077	0.902	0.52	0.438	0.076	0.18	0.007	0.062
HCM Control Delay	11.9	11	44.1	15.1	13.2	8.4	13.3	10.9	10.6
HCM Lane LOS	B	B	E	C	B	A	B	B	B
HCM 95th-tile Q	0.1	0.2	10.7	3	2.2	0.2	0.6	0	0.2

Existing + Approved/Pending/Proposed + Projects Phase 2 PM
4: SR 41 SB Ramp & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Vol, veh/h	0	292	147	105	423	0	0	0	0	115	0	81
Future Vol, veh/h	0	292	147	105	423	0	0	0	0	115	0	81
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	352	177	117	470	0	0	0	0	120	0	84

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	529	0	0	1145	1233	235
Stage 1	-	-	-	-	-	-	704	704	-
Stage 2	-	-	-	-	-	-	441	529	-
Critical Hdwy	-	-	-	4.175	-	-	6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-	5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-	3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	1018	-	0	203	173	759
Stage 1	0	-	-	-	-	0	446	433	-
Stage 2	0	-	-	-	-	0	640	520	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1018	-	-	180	0	759
Mov Cap-2 Maneuver	-	-	-	-	-	-	180	0	-
Stage 1	-	-	-	-	-	-	446	0	-
Stage 2	-	-	-	-	-	-	566	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	1.8	38.1
HCM LOS			E

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1018	-	180	759
HCM Lane V/C Ratio	-	-	0.115	-	0.666	0.111
HCM Control Delay (s)	-	-	9	-	57.7	10.3
HCM Lane LOS	-	-	A	-	F	B
HCM 95th %tile Q(veh)	-	-	0.4	-	3.9	0.4

Intersection	
Int Delay, s/veh	8.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	63	344	0	0	310	98	218	1	237	0	0	0
Future Vol, veh/h	63	344	0	0	310	98	218	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	72	395	0	0	352	111	237	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	463	0	-	-	-	0	715	1002	395
Stage 1	-	-	-	-	-	-	539	539	-
Stage 2	-	-	-	-	-	-	176	463	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1084	-	0	0	-	-	377	239	648
Stage 1	-	-	0	0	-	-	579	517	-
Stage 2	-	-	0	0	-	-	832	559	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1084	-	-	-	-	-	352	0	648
Mov Cap-2 Maneuver	-	-	-	-	-	-	352	0	-
Stage 1	-	-	-	-	-	-	541	0	-
Stage 2	-	-	-	-	-	-	832	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0	23.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	352	648	1084	-	-	-
HCM Lane V/C Ratio	0.676	0.398	0.067	-	-	-
HCM Control Delay (s)	34.1	14.2	8.6	-	-	-
HCM Lane LOS	D	B	A	-	-	-
HCM 95th %tile Q(veh)	4.7	1.9	0.2	-	-	-

Existing + Approved/Pending/Proposed + Projects Phase 2 PM
6: 19 1/2 Avenue & Bush Street

08/24/2019

Intersection	
Intersection Delay, s/veh	13.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	217	241	123	18	189	16	91	57	19	16	42	128
Future Vol, veh/h	217	241	123	18	189	16	91	57	19	16	42	128
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	255	284	145	20	208	18	98	61	20	17	45	136
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	15.3	12.4	12.4	12
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	80%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	20%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	57	19	217	241	123	18	126	79	16	42
LT Vol	91	0	0	217	0	0	18	0	0	16	0
Through Vol	0	57	0	0	241	0	0	126	63	0	42
RT Vol	0	0	19	0	0	123	0	0	16	0	0
Lane Flow Rate	98	61	20	255	284	145	20	138	87	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.224	0.132	0.04	0.506	0.522	0.239	0.044	0.286	0.176	0.039	0.096
Departure Headway (Hd)	8.224	7.724	7.024	7.134	6.634	5.934	7.924	7.424	7.283	8.217	7.717
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	436	465	510	508	547	609	452	485	493	436	465
Service Time	5.969	5.469	4.769	4.834	4.334	3.634	5.667	5.167	5.025	5.961	5.461
HCM Lane V/C Ratio	0.225	0.131	0.039	0.502	0.519	0.238	0.044	0.285	0.176	0.039	0.097
HCM Control Delay	13.3	11.6	10.1	16.9	16.3	10.5	11	13.1	11.6	11.3	11.3
HCM Lane LOS	B	B	B	C	C	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.5	0.1	2.8	3	0.9	0.1	1.2	0.6	0.1	0.3

APPENDIX T

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ---------------- ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. --------- ☐

☒ URBAN (U)

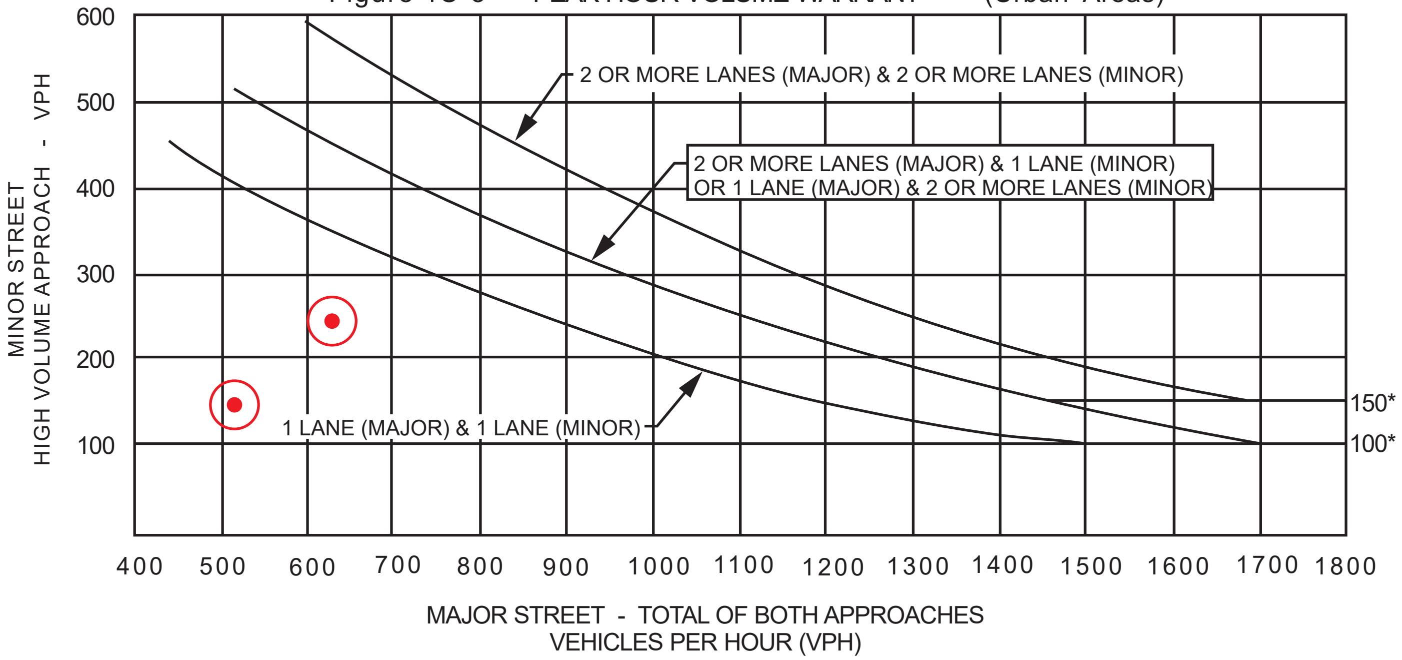
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	630	517			
Highest Approaches - Minor Street	✓		244	144			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: SEMAS Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

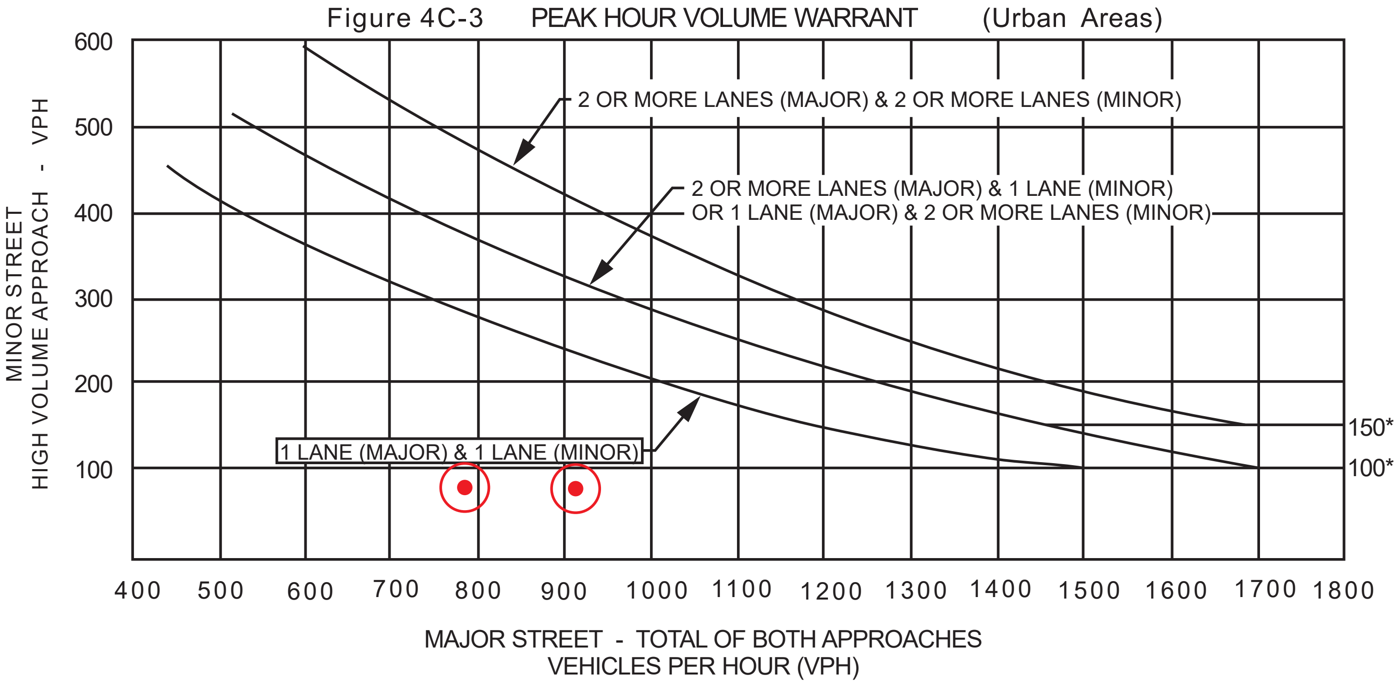
☒ URBAN (U)

CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street	✓		912	786			
Highest Approaches - Minor Street	✓		78	79			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

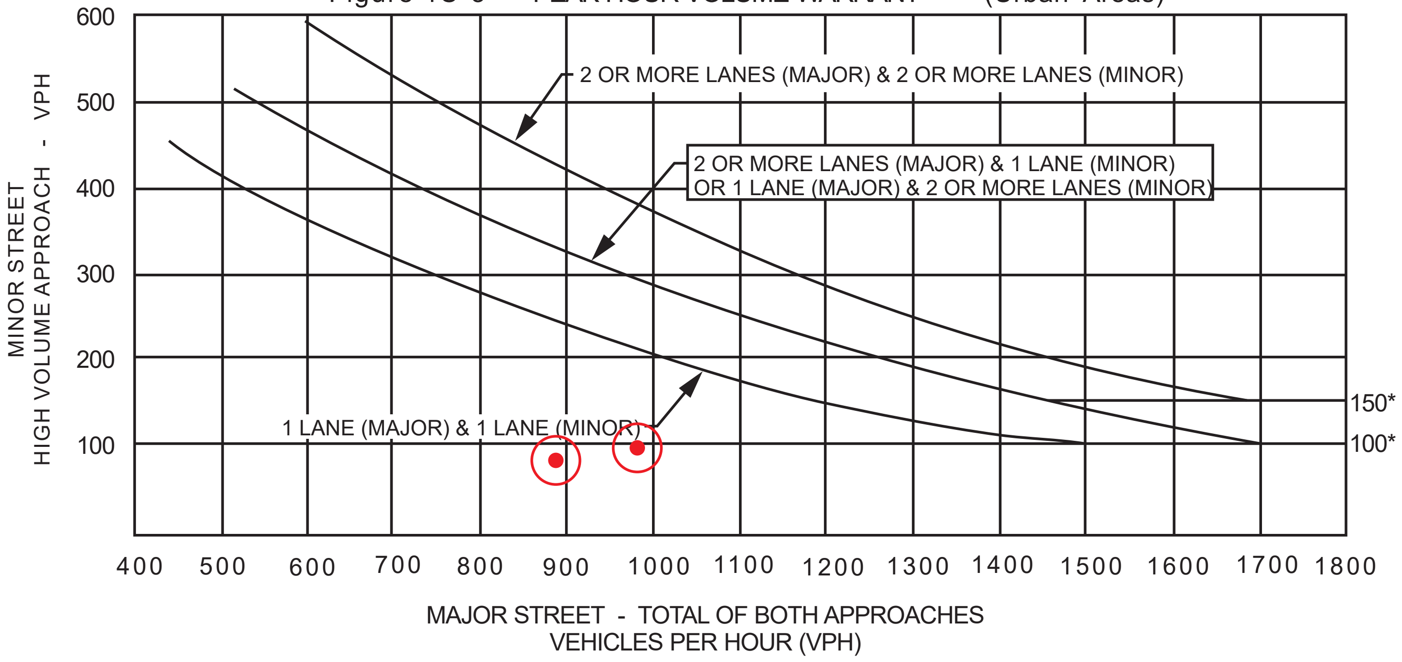
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	980	886			
Highest Approaches - Minor Street	✓		96	82			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ RURAL (R)

or

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

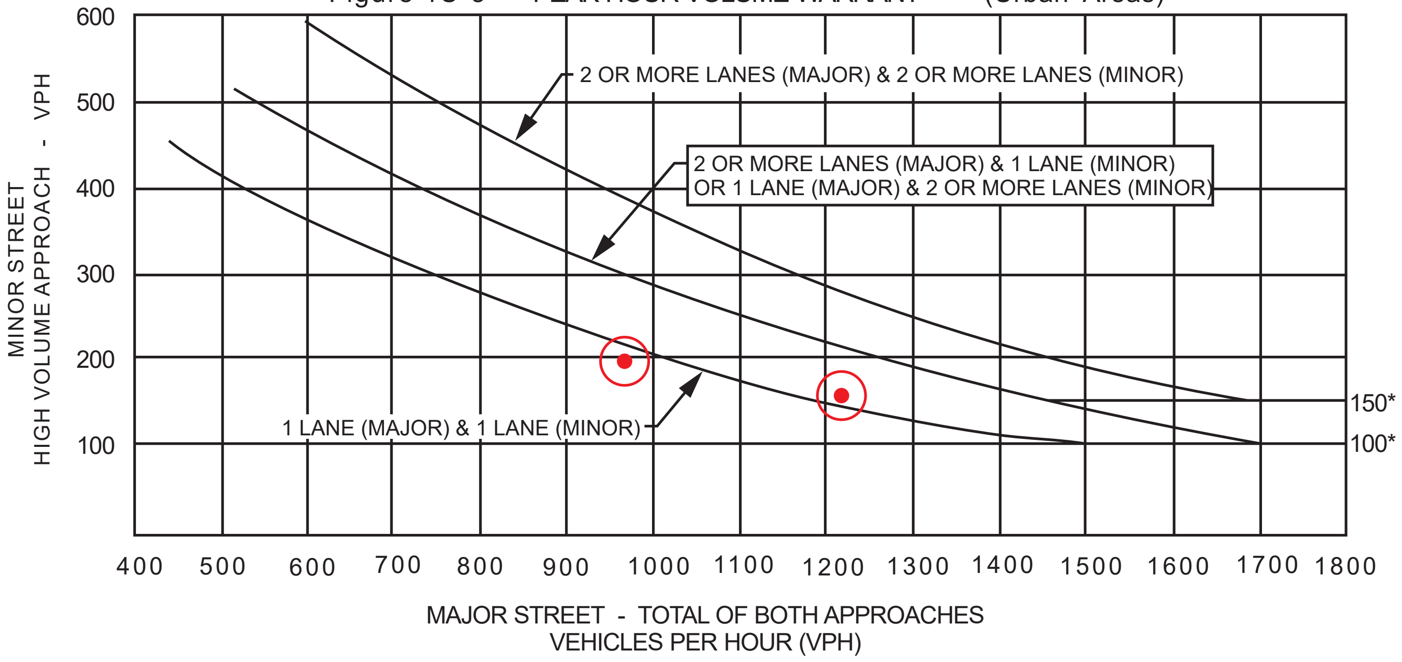
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1219	966			
Highest Approaches - Minor Street	✓		157	196			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ---------------- ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. --------- ☐

☒ URBAN (U)

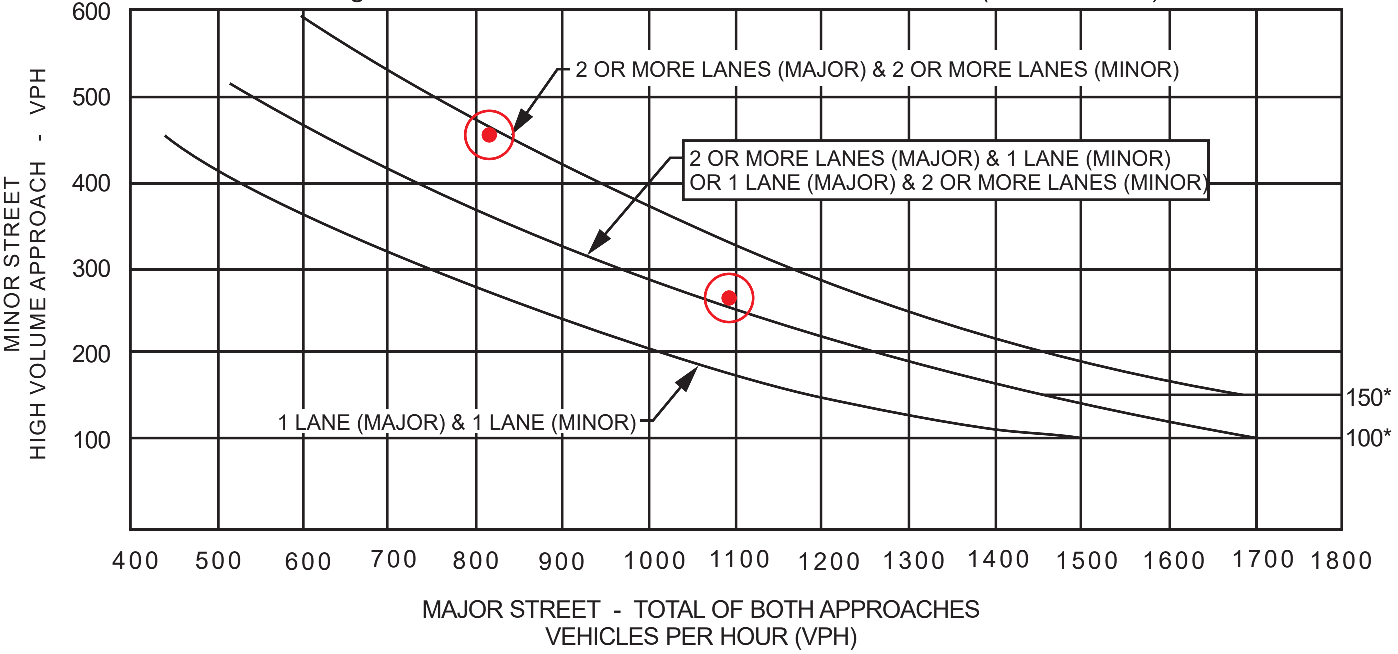
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☒ NO ☐

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1092	814			
Highest Approaches - Minor Street		✓	264	456			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

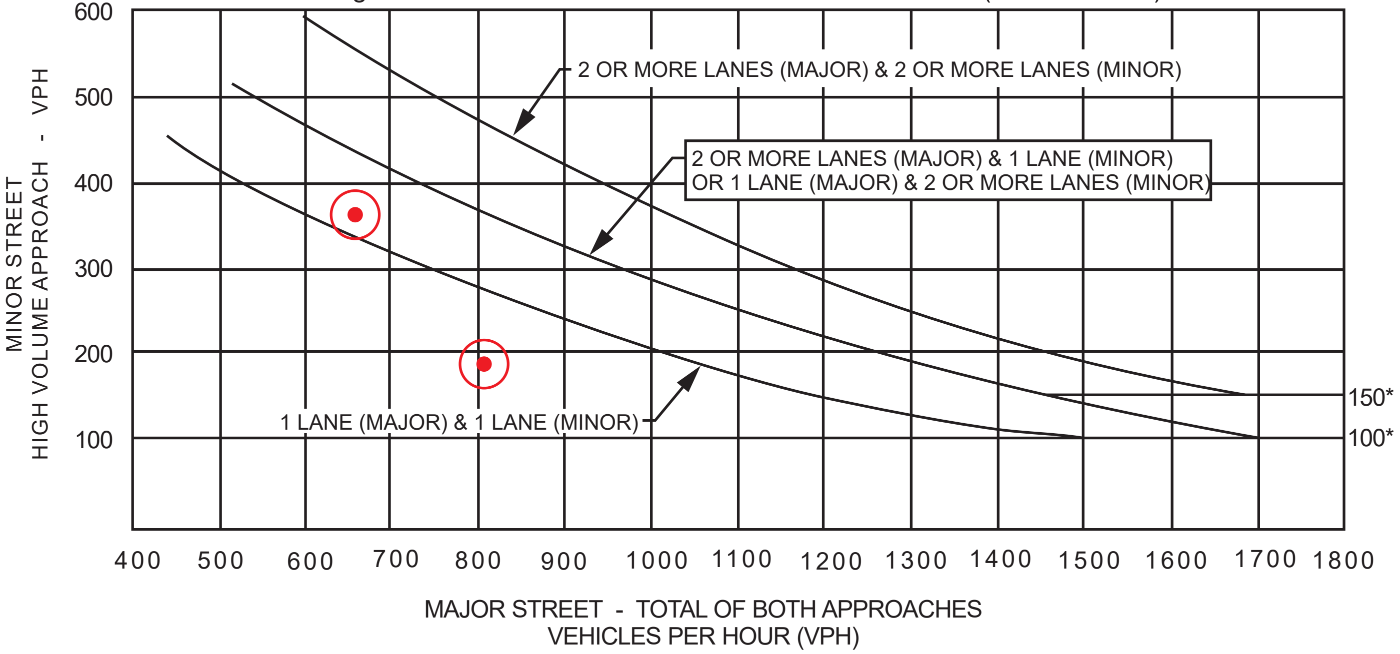
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1 & 2 - 264 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	659	805			
Highest Approaches - Minor Street	✓		364	186			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX U

MITIGATED

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 CONDITIONS

ALTERNATIVE A

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Mitigated Existing + Approved/Pending/Proposed + Project Phase 2 AM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	11.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↑↱			↰	↱		↰↑↱	
Traffic Vol, veh/h	2	54	8	306	258	3	9	0	236	11	1	5
Future Vol, veh/h	2	54	8	306	258	3	9	0	236	11	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	394	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	58	58	58	45	45	45	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	68	10	528	445	5	20	0	524	20	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	450	0	0	78	0	0	1359	1585	39	1544	1588	225
Stage 1	-	-	-	-	-	-	79	79	-	1504	1504	-
Stage 2	-	-	-	-	-	-	1280	1506	-	40	84	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1107	-	-	1518	-	-	107	107	1024	78	107	778
Stage 1	-	-	-	-	-	-	921	829	-	127	183	-
Stage 2	-	-	-	-	-	-	175	182	-	970	824	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1107	-	-	1518	-	-	76	70	1024	28	70	778
Mov Cap-2 Maneuver	-	-	-	-	-	-	76	70	-	28	70	-
Stage 1	-	-	-	-	-	-	918	827	-	127	119	-
Stage 2	-	-	-	-	-	-	111	119	-	472	822	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.7	14.2	215.1
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	76	1024	1107	-	-	1518	-	-	41
HCM Lane V/C Ratio	0.263	0.512	0.002	-	-	0.348	-	-	0.74
HCM Control Delay (s)	68.5	12.1	8.3	0	-	8.6	-	-	215.1
HCM Lane LOS	F	B	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	0.9	3	0	-	-	1.6	-	-	2.8

2: Semas Drive & Bush Street

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✥			✥	
Traffic Vol, veh/h	0	337	12	26	538	0	12	0	66	0	0	1
Future Vol, veh/h	0	337	12	26	538	0	12	0	66	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	636	23	45	928	0	22	0	120	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	928	0	0	659	0	0	1202	1666	330	1336	1677	464
Stage 1	-	-	-	-	-	-	648	648	-	1018	1018	-
Stage 2	-	-	-	-	-	-	554	1018	-	318	659	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	733	-	-	925	-	-	140	96	666	112	94	545
Stage 1	-	-	-	-	-	-	425	464	-	254	313	-
Stage 2	-	-	-	-	-	-	484	313	-	668	459	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	733	-	-	925	-	-	129	86	666	85	85	545
Mov Cap-2 Maneuver	-	-	-	-	-	-	129	86	-	85	85	-
Stage 1	-	-	-	-	-	-	425	464	-	254	282	-
Stage 2	-	-	-	-	-	-	434	282	-	548	459	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.8	18.6	11.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	406	733	-	-	925	-	-	545
HCM Lane V/C Ratio	0.349	-	-	-	0.048	-	-	0.003
HCM Control Delay (s)	18.6	0	-	-	9.1	0.4	-	11.6
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	1.5	0	-	-	0.2	-	-	0

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	49	711	33	839	74	14	68	78	66
v/c Ratio	0.32	0.97	0.21	0.60	0.11	0.09	0.10	0.45	0.08
Control Delay	44.3	55.3	30.0	15.1	0.4	39.2	0.3	46.8	0.2
Queue Delay	0.0	2.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	57.7	30.0	15.5	0.4	39.2	0.3	46.8	0.2
Queue Length 50th (ft)	27	~405	17	95	0	7	0	42	0
Queue Length 95th (ft)	36	252	28	73	0	16	0	63	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	156	733	156	1398	686	154	688	187	834
Starvation Cap Reductn	0	0	0	179	0	0	0	0	0
Spillback Cap Reductn	0	10	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.98	0.21	0.69	0.11	0.09	0.10	0.42	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	26	363	14	20	512	45	8	0	39	52	0	44
Future Volume (veh/h)	26	363	14	20	512	45	8	0	39	52	0	44
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	49	685	26	33	839	74	14	0	68	78	0	66
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	110	675	26	88	1296	564	226	0	341	259	438	371
Arrive On Green	0.06	0.38	0.38	0.10	0.74	0.74	0.13	0.00	0.22	0.15	0.00	0.24
Sat Flow, veh/h	1753	1762	67	1753	3497	1522	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	49	0	711	33	839	74	14	0	68	78	0	66
Grp Sat Flow(s),veh/h/ln	1753	0	1829	1753	1749	1522	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	2.4	0.0	34.5	1.6	10.8	0.8	0.6	0.0	3.2	3.6	0.0	2.4
Cycle Q Clear(g_c), s	2.4	0.0	34.5	1.6	10.8	0.8	0.6	0.0	3.2	3.6	0.0	2.4
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	0	701	88	1296	564	226	0	341	259	438	371
V/C Ratio(X)	0.45	0.00	1.01	0.38	0.65	0.13	0.06	0.00	0.20	0.30	0.00	0.18
Avail Cap(c_a), veh/h	158	0	701	158	1341	584	226	0	341	259	438	371
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.7	0.0	27.8	39.2	8.7	2.8	34.4	0.0	28.7	34.2	0.0	16.9
Incr Delay (d2), s/veh	2.8	0.0	37.6	2.6	1.0	0.1	0.1	0.0	1.3	0.6	0.0	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	1.1	0.0	21.0	0.7	2.6	0.4	0.3	0.0	1.3	1.5	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.5	0.0	65.3	41.8	9.7	2.9	34.5	0.0	30.0	34.8	0.0	17.9
LnGrp LOS	D	A	F	D	A	A	C	A	C	C	A	B
Approach Vol, veh/h		760			946			82			144	
Approach Delay, s/veh		63.9			10.3			30.8			27.1	
Approach LOS		E			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.8	24.2	9.0	39.0	16.1	25.9	10.1	37.8
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	9.7	19.7	8.1	34.5	8.0	21.4	8.1	34.5
Max Q Clear Time (g_c+I1), s	5.6	5.2	3.6	36.5	2.6	4.4	4.4	12.8
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	6.2

Intersection Summary	
HCM 6th Ctrl Delay	33.5
HCM 6th LOS	C

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	500	283	353	591	80	132
v/c Ratio	0.85	0.41	0.83	0.28	0.16	0.25
Control Delay	15.9	1.5	46.5	4.0	29.3	7.1
Queue Delay	2.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	1.5	46.5	4.0	29.3	7.1
Queue Length 50th (ft)	69	0	187	22	36	0
Queue Length 95th (ft)	39	0	265	50	63	25
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	659	741	491	2410	487	526
Starvation Cap Reductn	64	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.38	0.72	0.25	0.16	0.25

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	290	164	286	479	0	0	0	0	59	0	98
Future Volume (veh/h)	0	290	164	286	479	0	0	0	0	59	0	98
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	500	283	353	591	0				80	0	132
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	566	480	393	2035	0				558	0	496
Arrive On Green	0.00	0.31	0.31	0.22	0.58	0.00				0.32	0.00	0.32
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1558
Grp Volume(v), veh/h	0	500	283	353	591	0				80	0	132
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1558
Q Serve(g_s), s	0.0	23.2	13.8	17.6	7.7	0.0				2.9	0.0	5.7
Cycle Q Clear(g_c), s	0.0	23.2	13.8	17.6	7.7	0.0				2.9	0.0	5.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	566	480	393	2035	0				558	0	496
V/C Ratio(X)	0.00	0.88	0.59	0.90	0.29	0.00				0.14	0.00	0.27
Avail Cap(c_a), veh/h	0	665	563	497	2429	0				558	0	496
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.28	0.28	0.53	0.53	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	29.6	26.3	33.9	9.5	0.0				21.9	0.0	22.9
Incr Delay (d2), s/veh	0.0	3.8	0.3	9.7	0.0	0.0				0.5	0.0	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	0.0	10.4	5.0	8.3	2.6	0.0				1.3	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	33.4	26.7	43.6	9.5	0.0				22.5	0.0	24.2
LnGrp LOS	A	C	C	D	A	A				C	A	C
Approach Vol, veh/h		783			944						212	
Approach Delay, s/veh		31.0			22.2						23.5	
Approach LOS		C			C						C	

Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			24.7	32.2		33.1		56.9				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			25.5	32.5		18.5		62.5				
Max Q Clear Time (g_c+I1), s			19.6	25.2		7.7		9.7				
Green Ext Time (p_c), s			0.6	2.5		0.6		4.5				

Intersection Summary	
HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

5: SR 41 NB Ramp & Bush Street

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	108	464	906	246	111
v/c Ratio	0.51	0.53	0.78	0.33	0.15
Control Delay	21.9	9.8	30.3	22.4	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	9.8	30.3	22.4	5.3
Queue Length 50th (ft)	49	61	227	98	0
Queue Length 95th (ft)	53	0	238	144	22
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	262	1096	1359	742	726
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.42	0.67	0.33	0.15

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	66	283	0	0	585	158	180	2	82	0	0	0
Future Volume (veh/h)	66	283	0	0	585	158	180	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	108	464	0	0	713	193	243	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	147	830	0	0	858	232	791	10	712			
Arrive On Green	0.17	0.89	0.00	0.00	0.31	0.31	0.45	0.45	0.45			
Sat Flow, veh/h	1767	1856	0	0	2821	738	1747	22	1572			
Grp Volume(v), veh/h	108	464	0	0	461	445	246	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1704	1768	0	1572			
Q Serve(g_s), s	5.2	4.8	0.0	0.0	21.8	21.8	8.0	0.0	3.7			
Cycle Q Clear(g_c), s	5.2	4.8	0.0	0.0	21.8	21.8	8.0	0.0	3.7			
Prop In Lane	1.00		0.00	0.00		0.43	0.99		1.00			
Lane Grp Cap(c), veh/h	147	830	0	0	554	536	801	0	712			
V/C Ratio(X)	0.74	0.56	0.00	0.00	0.83	0.83	0.31	0.00	0.16			
Avail Cap(c_a), veh/h	265	1103	0	0	695	672	801	0	712			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.41	0.41	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.6	2.9	0.0	0.0	28.6	28.6	15.7	0.0	14.5			
Incr Delay (d2), s/veh	3.0	0.2	0.0	0.0	6.9	7.1	1.0	0.0	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			
%ile BackOfQ(50%),veh/ln	2.2	1.1	0.0	0.0	9.8	9.5	3.3	0.0	1.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	3.1	0.0	0.0	35.6	35.8	16.6	0.0	15.0			
LnGrp LOS	D	A	A	A	D	D	B	A	B			
Approach Vol, veh/h		572			906			357				
Approach Delay, s/veh		10.0			35.7			16.1				
Approach LOS		B			D			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		45.2		44.8			12.0	32.8				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		27.5		53.5			13.5	35.5				
Max Q Clear Time (g_c+I1), s		10.0		6.8			7.2	23.8				
Green Ext Time (p_c), s		1.7		3.2			0.1	4.4				
Intersection Summary												
HCM 6th Ctrl Delay			23.9									
HCM 6th LOS			C									

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	29
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	104	181	80	22	248	22	193	53	19	32	59	302
Future Vol, veh/h	104	181	80	22	248	22	193	53	19	32	59	302
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	193	335	148	26	288	26	276	76	27	36	67	343
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	23.8	20.6	34.4	38.7
HCM LOS	C	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	43%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	57%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	193	53	19	104	121	140	22	165	105	32	59	302
LT Vol	193	0	0	104	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	121	60	0	165	83	0	59	0
RT Vol	0	0	19	0	0	80	0	0	22	0	0	302
Lane Flow Rate	276	76	27	193	223	260	26	192	122	36	67	343
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.784	0.205	0.068	0.515	0.566	0.63	0.074	0.531	0.331	0.102	0.179	0.852
Departure Headway (Hd)	10.24	9.74	9.04	9.626	9.126	8.726	10.442	9.942	9.795	10.138	9.638	8.938
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	353	368	395	374	396	413	342	361	366	353	371	405
Service Time	8.022	7.522	6.822	7.398	6.898	6.499	8.228	7.728	7.581	7.918	7.418	6.718
HCM Lane V/C Ratio	0.782	0.207	0.068	0.516	0.563	0.63	0.076	0.532	0.333	0.102	0.181	0.847
HCM Control Delay	41.9	15	12.5	22.3	23.2	25.3	14.1	23.5	17.4	14.1	14.5	46
HCM Lane LOS	E	B	B	C	C	D	B	C	C	B	B	E
HCM 95th-tile Q	6.5	0.8	0.2	2.8	3.4	4.2	0.2	3	1.4	0.3	0.6	8.2

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↑↑↱			↰	↱		✥	
Traffic Vol, veh/h	7	175	10	158	159	9	7	0	137	9	1	3
Future Vol, veh/h	7	175	10	158	159	9	7	0	137	9	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	394	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	65	65	65	65	65	65	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	211	12	243	245	14	11	0	211	13	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	223	0	0	844	978	114	862	977	132
Stage 1	-	-	-	-	-	-	233	233	-	738	738	-
Stage 2	-	-	-	-	-	-	611	745	-	124	239	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1303	-	-	1343	-	-	256	249	917	249	249	893
Stage 1	-	-	-	-	-	-	749	711	-	376	422	-
Stage 2	-	-	-	-	-	-	448	419	-	867	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1303	-	-	1343	-	-	217	202	915	164	202	891
Mov Cap-2 Maneuver	-	-	-	-	-	-	217	202	-	164	202	-
Stage 1	-	-	-	-	-	-	744	706	-	373	346	-
Stage 2	-	-	-	-	-	-	363	343	-	661	701	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4	10.7	24.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	217	915	1303	-	-	1343	-	-	206
HCM Lane V/C Ratio	0.05	0.23	0.006	-	-	0.181	-	-	0.088
HCM Control Delay (s)	22.5	10.1	7.8	0	-	8.3	-	-	24.1
HCM Lane LOS	C	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.9	0	-	-	0.7	-	-	0.3

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✥			✥	
Traffic Vol, veh/h	0	323	9	114	340	0	21	0	58	0	0	2
Future Vol, veh/h	0	323	9	114	340	0	21	0	58	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	419	12	175	523	0	30	0	82	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	523	0	0	431	0	0	1037	1298	216	1083	1304	262
Stage 1	-	-	-	-	-	-	425	425	-	873	873	-
Stage 2	-	-	-	-	-	-	612	873	-	210	431	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1040	-	-	1125	-	-	185	160	789	172	159	737
Stage 1	-	-	-	-	-	-	578	585	-	311	366	-
Stage 2	-	-	-	-	-	-	447	366	-	773	581	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1040	-	-	1125	-	-	153	125	789	128	124	737
Mov Cap-2 Maneuver	-	-	-	-	-	-	153	125	-	128	124	-
Stage 1	-	-	-	-	-	-	578	585	-	311	286	-
Stage 2	-	-	-	-	-	-	348	286	-	693	581	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.7	18.6	9.9
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	375	1040	-	-	1125	-	-	737
HCM Lane V/C Ratio	0.297	-	-	-	0.156	-	-	0.004
HCM Control Delay (s)	18.6	0	-	-	8.8	0.6	-	9.9
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	1.2	0	-	-	0.6	-	-	0

3: Belle Haven & Bush Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	25	470	50	523	58	15	36	75	3	30
v/c Ratio	0.18	0.82	0.36	0.41	0.09	0.11	0.06	0.44	0.00	0.04
Control Delay	46.2	43.1	44.2	20.6	2.4	44.8	10.9	50.8	26.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	43.1	44.2	20.6	2.4	44.8	10.9	50.8	26.0	0.1
Queue Length 50th (ft)	15	273	33	105	0	9	0	46	1	0
Queue Length 95th (ft)	35	277	61	126	0	29	26	76	7	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	144	724	144	1411	727	144	585	178	784	731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.65	0.35	0.37	0.08	0.10	0.06	0.42	0.00	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑	↱
Traffic Volume (veh/h)	19	351	11	40	418	46	13	1	31	57	2	23
Future Volume (veh/h)	19	351	11	40	418	46	13	1	31	57	2	23
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	25	456	14	50	522	58	15	1	35	75	3	30
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	69	512	16	104	1076	480	47	10	337	418	797	675
Arrive On Green	0.04	0.29	0.29	0.12	0.63	0.63	0.03	0.22	0.22	0.24	0.44	0.44
Sat Flow, veh/h	1725	1748	54	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	25	0	470	50	522	58	15	0	36	75	3	30
Grp Sat Flow(s),veh/h/ln	1725	0	1801	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	1.4	0.0	25.0	2.7	8.2	0.8	0.9	0.0	1.9	3.4	0.1	1.1
Cycle Q Clear(g_c), s	1.4	0.0	25.0	2.7	8.2	0.8	0.9	0.0	1.9	3.4	0.1	1.1
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	69	0	527	104	1076	480	47	0	347	418	797	675
V/C Ratio(X)	0.36	0.00	0.89	0.48	0.49	0.12	0.32	0.00	0.10	0.18	0.00	0.04
Avail Cap(c_a), veh/h	147	0	730	147	1394	622	147	0	347	418	797	675
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.93	0.93	0.93	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	0.0	33.8	42.5	14.4	3.5	47.7	0.0	30.7	30.0	15.7	16.0
Incr Delay (d2), s/veh	3.2	0.0	10.2	3.2	0.3	0.1	3.8	0.0	0.6	0.2	0.0	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	0.0	11.9	1.2	2.5	0.5	0.4	0.0	0.7	1.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.9	0.0	44.1	45.8	14.7	3.6	51.6	0.0	31.3	30.2	15.7	16.1
LnGrp LOS	D	A	D	D	B	A	D	A	C	C	B	B
Approach Vol, veh/h		495			630			51			108	
Approach Delay, s/veh		44.4			16.2			37.3			25.9	
Approach LOS		D			B			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.7	27.0	10.5	33.8	7.2	48.5	8.5	35.8
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	10.5	22.5	8.5	40.5	8.5	24.5	8.5	40.5
Max Q Clear Time (g_c+I1), s	5.4	3.9	4.7	27.0	2.9	3.1	3.4	10.2
Green Ext Time (p_c), s	0.1	0.1	0.0	2.3	0.0	0.1	0.0	3.9

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

4: SR 41 SB Ramp & Bush Street

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	352	177	117	470	120	84
v/c Ratio	0.63	0.30	0.51	0.44	0.14	0.10
Control Delay	15.3	3.2	20.2	13.8	8.8	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	3.2	20.2	13.8	8.8	3.2
Queue Length 50th (ft)	107	17	26	54	17	0
Queue Length 95th (ft)	79	18	50	73	49	20
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	778	748	320	1478	878	826
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.24	0.37	0.32	0.14	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	292	147	105	423	0	0	0	0	115	0	81
Future Volume (veh/h)	0	292	147	105	423	0	0	0	0	115	0	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	352	177	117	470	0				120	0	84
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	649	538	316	1234	0				807	0	718
Arrive On Green	0.00	0.36	0.36	0.36	0.36	0.00				0.46	0.00	0.46
Sat Flow, veh/h	0	1826	1513	854	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	352	177	117	470	0				120	0	84
Grp Sat Flow(s),veh/h/ln	0	1826	1513	854	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	7.7	4.3	6.3	5.0	0.0				2.0	0.0	1.5
Cycle Q Clear(g_c), s	0.0	7.7	4.3	14.0	5.0	0.0				2.0	0.0	1.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	649	538	316	1234	0				807	0	718
V/C Ratio(X)	0.00	0.54	0.33	0.37	0.38	0.00				0.15	0.00	0.12
Avail Cap(c_a), veh/h	0	785	651	380	1492	0				807	0	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.55	0.55	0.92	0.92	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.9	11.8	18.5	12.0	0.0				7.7	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.7	0.2	0.0				0.4	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	2.6	1.2	1.1	1.6	0.0				0.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.2	11.9	19.1	12.2	0.0				8.1	0.0	7.9
LnGrp LOS	A	B	B	B	B	A				A	A	A
Approach Vol, veh/h		529			587						204	
Approach Delay, s/veh		12.8			13.6						8.0	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				22.3		27.7		22.3				
Change Period (Y+Rc), s				4.5		4.5		4.5				
Max Green Setting (Gmax), s				21.5		19.5		21.5				
Max Q Clear Time (g_c+I1), s				9.7		4.0		16.0				
Green Ext Time (p_c), s				2.1		0.8		1.8				
Intersection Summary												
HCM 6th Ctrl Delay			12.4									
HCM 6th LOS			B									

5: SR 41 NB Ramp & Bush Street

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	72	395	463	238	258
v/c Ratio	0.27	0.67	0.40	0.27	0.29
Control Delay	7.7	15.2	10.3	9.9	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	15.2	10.3	9.9	2.7
Queue Length 50th (ft)	14	178	41	37	0
Queue Length 95th (ft)	19	141	56	91	34
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	362	785	1498	867	902
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.50	0.31	0.27	0.29

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	63	344	0	0	310	98	218	1	237	0	0	0
Future Volume (veh/h)	63	344	0	0	310	98	218	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	72	395	0	0	352	111	237	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	297	517	0	0	737	229	942	4	841			
Arrive On Green	0.19	0.19	0.00	0.00	0.28	0.28	0.54	0.54	0.54			
Sat Flow, veh/h	915	1841	0	0	2718	816	1746	7	1560			
Grp Volume(v), veh/h	72	395	0	0	233	230	238	0	258			
Grp Sat Flow(s),veh/h/ln	915	1841	0	0	1749	1694	1753	0	1560			
Q Serve(g_s), s	3.7	10.2	0.0	0.0	5.5	5.7	3.6	0.0	4.6			
Cycle Q Clear(g_c), s	9.4	10.2	0.0	0.0	5.5	5.7	3.6	0.0	4.6			
Prop In Lane	1.00		0.00	0.00		0.48	1.00		1.00			
Lane Grp Cap(c), veh/h	297	517	0	0	491	475	946	0	841			
V/C Ratio(X)	0.24	0.76	0.00	0.00	0.47	0.48	0.25	0.00	0.31			
Avail Cap(c_a), veh/h	434	792	0	0	752	728	946	0	841			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.74	0.74	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.0	18.7	0.0	0.0	14.9	15.0	6.1	0.0	6.4			
Incr Delay (d2), s/veh	0.3	1.8	0.0	0.0	0.7	0.8	0.6	0.0	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			
%ile BackOfQ(50%),veh/ln	0.8	4.3	0.0	0.0	1.9	1.9	1.1	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	20.5	0.0	0.0	15.6	15.7	6.8	0.0	7.3			
LnGrp LOS	C	C	A	A	B	B	A	A	A			
Approach Vol, veh/h		467			463			496				
Approach Delay, s/veh		20.6			15.7			7.1				
Approach LOS		C			B			A				

Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		31.5		18.5				18.5				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		19.5		21.5				21.5				
Max Q Clear Time (g_c+I1), s		6.6		12.2				7.7				
Green Ext Time (p_c), s		1.9		1.9				2.3				

Intersection Summary			
HCM 6th Ctrl Delay			14.3
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	217	241	123	18	189	16	91	57	19	16	42	128
Future Vol, veh/h	217	241	123	18	189	16	91	57	19	16	42	128
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	255	284	145	20	208	18	98	61	20	17	45	136
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.5	12.4	12.3	12
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	40%	0%	100%	80%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	60%	0%	0%	20%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	57	19	217	161	203	18	126	79	16	42	128
LT Vol	91	0	0	217	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	161	80	0	126	63	0	42	0
RT Vol	0	0	19	0	0	123	0	0	16	0	0	128
Lane Flow Rate	98	61	20	255	189	239	20	138	87	17	45	136
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.223	0.131	0.04	0.505	0.348	0.412	0.043	0.285	0.175	0.039	0.096	0.265
Departure Headway (Hd)	8.215	7.715	7.015	7.127	6.627	6.203	7.916	7.416	7.274	8.205	7.705	7.005
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	437	465	511	508	546	584	453	485	493	437	466	513
Service Time	5.954	5.454	4.754	4.827	4.327	3.903	5.656	5.156	5.014	5.943	5.443	4.743
HCM Lane V/C Ratio	0.224	0.131	0.039	0.502	0.346	0.409	0.044	0.285	0.176	0.039	0.097	0.265
HCM Control Delay	13.3	11.6	10	16.9	12.8	13.2	11	13.1	11.6	11.3	11.3	12.3
HCM Lane LOS	B	B	A	C	B	B	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.4	0.1	2.8	1.5	2	0.1	1.2	0.6	0.1	0.3	1.1

APPENDIX V

MITIGATED

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1 & 2 CONDITIONS

ALTERNATIVE B

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	81	978	544	31
Demand Flow Rate, veh/h	82	998	554	31
Vehicles Circulating, veh/h	561	23	92	1013
Vehicles Exiting, veh/h	483	623	551	8
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.8	13.7	7.4	8.1
Approach LOS	A	B	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	82	998	554	31
Cap Entry Lane, veh/h	779	1348	1256	491
Entry HV Adj Factor	0.984	0.980	0.982	0.999
Flow Entry, veh/h	81	978	544	31
Cap Entry, veh/h	766	1321	1234	490
V/C Ratio	0.105	0.740	0.441	0.063
Control Delay, s/veh	5.8	13.7	7.4	8.1
LOS	A	B	A	A
95th %tile Queue, veh	0	7	2	0

2: Semas Drive & Bush Street

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	337	12	26	538	0	12	0	66	0	0	1
Future Vol, veh/h	0	337	12	26	538	0	12	0	66	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	636	23	45	928	0	22	0	120	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	928	0	0	659	0	0	1202	1666	648	1726	1677	464
Stage 1	-	-	-	-	-	-	648	648	-	1018	1018	-
Stage 2	-	-	-	-	-	-	554	1018	-	708	659	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	735	-	-	927	-	-	150	96	469	63	95	546
Stage 1	-	-	-	-	-	-	458	465	-	255	314	-
Stage 2	-	-	-	-	-	-	485	314	-	425	460	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	735	-	-	927	-	-	138	86	469	43	86	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	138	86	-	43	86	-
Stage 1	-	-	-	-	-	-	458	465	-	255	283	-
Stage 2	-	-	-	-	-	-	435	283	-	316	460	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.8	22.7	11.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	343	735	-	-	927	-	-	546
HCM Lane V/C Ratio	0.413	-	-	-	0.048	-	-	0.003
HCM Control Delay (s)	22.7	0	-	-	9.1	0.4	-	11.6
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	2	0	-	-	0.2	-	-	0

3: Belle Haven & Bush Street

	↗	→	↙	←	↖	↖	↑	↘	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	49	711	33	839	74	14	68	78	66
v/c Ratio	0.32	0.97	0.21	0.60	0.11	0.09	0.10	0.45	0.08
Control Delay	44.3	55.3	30.0	15.1	0.4	39.2	0.3	46.8	0.2
Queue Delay	0.0	2.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	57.7	30.0	15.5	0.4	39.2	0.3	46.8	0.2
Queue Length 50th (ft)	27	~405	17	95	0	7	0	42	0
Queue Length 95th (ft)	36	252	28	73	0	16	0	63	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	156	733	156	1398	686	154	688	187	834
Starvation Cap Reductn	0	0	0	179	0	0	0	0	0
Spillback Cap Reductn	0	10	0	0	0	0	1	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.98	0.21	0.69	0.11	0.09	0.10	0.42	0.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	26	363	14	20	512	45	8	0	39	52	0	44
Future Volume (veh/h)	26	363	14	20	512	45	8	0	39	52	0	44
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	49	685	26	33	839	74	14	0	68	78	0	66
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	110	675	26	88	1296	564	226	0	341	259	438	371
Arrive On Green	0.06	0.38	0.38	0.10	0.74	0.74	0.13	0.00	0.22	0.15	0.00	0.24
Sat Flow, veh/h	1753	1762	67	1753	3497	1522	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	49	0	711	33	839	74	14	0	68	78	0	66
Grp Sat Flow(s),veh/h/ln	1753	0	1829	1753	1749	1522	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	2.4	0.0	34.5	1.6	10.8	0.8	0.6	0.0	3.2	3.6	0.0	2.4
Cycle Q Clear(g_c), s	2.4	0.0	34.5	1.6	10.8	0.8	0.6	0.0	3.2	3.6	0.0	2.4
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	0	701	88	1296	564	226	0	341	259	438	371
V/C Ratio(X)	0.45	0.00	1.01	0.38	0.65	0.13	0.06	0.00	0.20	0.30	0.00	0.18
Avail Cap(c_a), veh/h	158	0	701	158	1341	584	226	0	341	259	438	371
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.7	0.0	27.8	39.2	8.7	2.8	34.4	0.0	28.7	34.2	0.0	16.9
Incr Delay (d2), s/veh	2.8	0.0	37.6	2.6	1.0	0.1	0.1	0.0	1.3	0.6	0.0	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	1.1	0.0	21.0	0.7	2.6	0.4	0.3	0.0	1.3	1.5	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.5	0.0	65.3	41.8	9.7	2.9	34.5	0.0	30.0	34.8	0.0	17.9
LnGrp LOS	D	A	F	D	A	A	C	A	C	C	A	B
Approach Vol, veh/h		760			946			82			144	
Approach Delay, s/veh		63.9			10.3			30.8			27.1	
Approach LOS		E			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.8	24.2	9.0	39.0	16.1	25.9	10.1	37.8
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	9.7	19.7	8.1	34.5	8.0	21.4	8.1	34.5
Max Q Clear Time (g_c+I1), s	5.6	5.2	3.6	36.5	2.6	4.4	4.4	12.8
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	6.2

Intersection Summary	
HCM 6th Ctrl Delay	33.5
HCM 6th LOS	C

Mitigated Existing + Approved/Pending/Proposed + Project Phase 2 Roundabout AM
4: SR 41 SB Ramp & Bush Street

08/27/2019

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	500	283	353	591	80	132
v/c Ratio	0.85	0.41	0.83	0.28	0.16	0.25
Control Delay	15.9	1.5	46.5	4.0	29.3	7.1
Queue Delay	2.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	1.5	46.5	4.0	29.3	7.1
Queue Length 50th (ft)	69	0	187	22	36	0
Queue Length 95th (ft)	39	0	265	50	63	25
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	659	741	491	2410	487	526
Starvation Cap Reductn	64	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.38	0.72	0.25	0.16	0.25

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	290	164	286	479	0	0	0	0	59	0	98
Future Volume (veh/h)	0	290	164	286	479	0	0	0	0	59	0	98
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	500	283	353	591	0				80	0	132
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	566	480	393	2035	0				558	0	496
Arrive On Green	0.00	0.31	0.31	0.22	0.58	0.00				0.32	0.00	0.32
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1558
Grp Volume(v), veh/h	0	500	283	353	591	0				80	0	132
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1558
Q Serve(g_s), s	0.0	23.2	13.8	17.6	7.7	0.0				2.9	0.0	5.7
Cycle Q Clear(g_c), s	0.0	23.2	13.8	17.6	7.7	0.0				2.9	0.0	5.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	566	480	393	2035	0				558	0	496
V/C Ratio(X)	0.00	0.88	0.59	0.90	0.29	0.00				0.14	0.00	0.27
Avail Cap(c_a), veh/h	0	665	563	497	2429	0				558	0	496
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.28	0.28	0.53	0.53	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	29.6	26.3	33.9	9.5	0.0				21.9	0.0	22.9
Incr Delay (d2), s/veh	0.0	3.8	0.3	9.7	0.0	0.0				0.5	0.0	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	0.0	10.4	5.0	8.3	2.6	0.0				1.3	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	33.4	26.7	43.6	9.5	0.0				22.5	0.0	24.2
LnGrp LOS	A	C	C	D	A	A				C	A	C
Approach Vol, veh/h		783			944						212	
Approach Delay, s/veh		31.0			22.2						23.5	
Approach LOS		C			C						C	

Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			24.7	32.2		33.1		56.9				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			25.5	32.5		18.5		62.5				
Max Q Clear Time (g_c+I1), s			19.6	25.2		7.7		9.7				
Green Ext Time (p_c), s			0.6	2.5		0.6		4.5				

Intersection Summary			
HCM 6th Ctrl Delay			25.9
HCM 6th LOS			C

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	108	464	906	246	111
v/c Ratio	0.51	0.53	0.78	0.33	0.15
Control Delay	21.9	9.8	30.3	22.4	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	9.8	30.3	22.4	5.3
Queue Length 50th (ft)	49	61	227	98	0
Queue Length 95th (ft)	53	0	238	144	22
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	262	1096	1359	742	726
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.42	0.67	0.33	0.15

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 2 Roundabout AM
5: SR 41 NB Ramp & Bush Street

08/27/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	66	283	0	0	585	158	180	2	82	0	0	0
Future Volume (veh/h)	66	283	0	0	585	158	180	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	108	464	0	0	713	193	243	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	147	830	0	0	858	232	791	10	712			
Arrive On Green	0.17	0.89	0.00	0.00	0.31	0.31	0.45	0.45	0.45			
Sat Flow, veh/h	1767	1856	0	0	2821	738	1747	22	1572			
Grp Volume(v), veh/h	108	464	0	0	461	445	246	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1704	1768	0	1572			
Q Serve(g_s), s	5.2	4.8	0.0	0.0	21.8	21.8	8.0	0.0	3.7			
Cycle Q Clear(g_c), s	5.2	4.8	0.0	0.0	21.8	21.8	8.0	0.0	3.7			
Prop In Lane	1.00		0.00	0.00		0.43	0.99		1.00			
Lane Grp Cap(c), veh/h	147	830	0	0	554	536	801	0	712			
V/C Ratio(X)	0.74	0.56	0.00	0.00	0.83	0.83	0.31	0.00	0.16			
Avail Cap(c_a), veh/h	265	1103	0	0	695	672	801	0	712			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.41	0.41	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.6	2.9	0.0	0.0	28.6	28.6	15.7	0.0	14.5			
Incr Delay (d2), s/veh	3.0	0.2	0.0	0.0	6.9	7.1	1.0	0.0	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			
%ile BackOfQ(50%),veh/ln	2.2	1.1	0.0	0.0	9.8	9.5	3.3	0.0	1.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	3.1	0.0	0.0	35.6	35.8	16.6	0.0	15.0			
LnGrp LOS	D	A	A	A	D	D	B	A	B			
Approach Vol, veh/h		572			906			357				
Approach Delay, s/veh		10.0			35.7			16.1				
Approach LOS		B			D			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		45.2		44.8			12.0	32.8				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		27.5		53.5			13.5	35.5				
Max Q Clear Time (g_c+I1), s		10.0		6.8			7.2	23.8				
Green Ext Time (p_c), s		1.7		3.2			0.1	4.4				
Intersection Summary												
HCM 6th Ctrl Delay			23.9									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	29
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	104	181	80	22	248	22	193	53	19	32	59	302
Future Vol, veh/h	104	181	80	22	248	22	193	53	19	32	59	302
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	193	335	148	26	288	26	276	76	27	36	67	343
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	23.8	20.6	34.4	38.7
HCM LOS	C	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	43%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	57%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	193	53	19	104	121	140	22	165	105	32	59	302
LT Vol	193	0	0	104	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	121	60	0	165	83	0	59	0
RT Vol	0	0	19	0	0	80	0	0	22	0	0	302
Lane Flow Rate	276	76	27	193	223	260	26	192	122	36	67	343
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.784	0.205	0.068	0.515	0.566	0.63	0.074	0.531	0.331	0.102	0.179	0.852
Departure Headway (Hd)	10.24	9.74	9.04	9.626	9.126	8.726	10.442	9.942	9.795	10.138	9.638	8.938
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	353	368	395	374	396	413	342	361	366	353	371	405
Service Time	8.022	7.522	6.822	7.398	6.898	6.499	8.228	7.728	7.581	7.918	7.418	6.718
HCM Lane V/C Ratio	0.782	0.207	0.068	0.516	0.563	0.63	0.076	0.532	0.333	0.102	0.181	0.847
HCM Control Delay	41.9	15	12.5	22.3	23.2	25.3	14.1	23.5	17.4	14.1	14.5	46
HCM Lane LOS	E	B	B	C	C	D	B	C	C	B	B	E
HCM 95th-tile Q	6.5	0.8	0.2	2.8	3.4	4.2	0.2	3	1.4	0.3	0.6	8.2

Intersection	
Intersection Delay, s/veh	5.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	231	502	222	18
Demand Flow Rate, veh/h	235	512	226	18
Vehicles Circulating, veh/h	262	19	236	509
Vehicles Exiting, veh/h	265	443	261	22
Ped Vol Crossing Leg, #/h	2	2	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.6	6.2	5.3	4.6
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	235	512	226	18
Cap Entry Lane, veh/h	1056	1353	1085	821
Entry HV Adj Factor	0.982	0.981	0.982	0.999
Flow Entry, veh/h	231	502	222	18
Cap Entry, veh/h	1037	1327	1065	820
V/C Ratio	0.223	0.378	0.208	0.022
Control Delay, s/veh	5.6	6.2	5.3	4.6
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	0

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			↰↱			✣			✣	
Traffic Vol, veh/h	0	323	9	114	340	0	21	0	58	0	0	2
Future Vol, veh/h	0	323	9	114	340	0	21	0	58	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	419	12	175	523	0	30	0	82	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	523	0	0	431	0	0	1037	1298	425	1339	1304	262
Stage 1	-	-	-	-	-	-	425	425	-	873	873	-
Stage 2	-	-	-	-	-	-	612	873	-	466	431	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1042	-	-	1127	-	-	197	161	628	120	160	737
Stage 1	-	-	-	-	-	-	606	586	-	312	367	-
Stage 2	-	-	-	-	-	-	448	367	-	576	582	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1042	-	-	1127	-	-	163	126	628	87	125	737
Mov Cap-2 Maneuver	-	-	-	-	-	-	163	126	-	87	125	-
Stage 1	-	-	-	-	-	-	606	586	-	312	287	-
Stage 2	-	-	-	-	-	-	349	287	-	501	582	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.7	19.6	9.9
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	357	1042	-	-	1127	-	-	737
HCM Lane V/C Ratio	0.312	-	-	-	0.156	-	-	0.004
HCM Control Delay (s)	19.6	0	-	-	8.8	0.6	-	9.9
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	1.3	0	-	-	0.6	-	-	0

3: Belle Haven & Bush Street

	↗	→	↙	←	↖	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	25	470	50	523	58	15	36	75	3	30
v/c Ratio	0.18	0.82	0.36	0.41	0.09	0.11	0.06	0.44	0.00	0.04
Control Delay	46.2	43.1	44.2	20.6	2.4	44.8	10.9	50.8	26.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	43.1	44.2	20.6	2.4	44.8	10.9	50.8	26.0	0.1
Queue Length 50th (ft)	15	273	33	105	0	9	0	46	1	0
Queue Length 95th (ft)	35	277	61	126	0	29	26	76	7	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	144	724	144	1411	727	144	585	178	784	731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.65	0.35	0.37	0.08	0.10	0.06	0.42	0.00	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	19	351	11	40	418	46	13	1	31	57	2	23
Future Volume (veh/h)	19	351	11	40	418	46	13	1	31	57	2	23
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	25	456	14	50	522	58	15	1	35	75	3	30
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	69	512	16	104	1076	480	47	10	337	418	797	675
Arrive On Green	0.04	0.29	0.29	0.12	0.63	0.63	0.03	0.22	0.22	0.24	0.44	0.44
Sat Flow, veh/h	1725	1748	54	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	25	0	470	50	522	58	15	0	36	75	3	30
Grp Sat Flow(s),veh/h/ln	1725	0	1801	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	1.4	0.0	25.0	2.7	8.2	0.8	0.9	0.0	1.9	3.4	0.1	1.1
Cycle Q Clear(g_c), s	1.4	0.0	25.0	2.7	8.2	0.8	0.9	0.0	1.9	3.4	0.1	1.1
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	69	0	527	104	1076	480	47	0	347	418	797	675
V/C Ratio(X)	0.36	0.00	0.89	0.48	0.49	0.12	0.32	0.00	0.10	0.18	0.00	0.04
Avail Cap(c_a), veh/h	147	0	730	147	1394	622	147	0	347	418	797	675
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.93	0.93	0.93	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	0.0	33.8	42.5	14.4	3.5	47.7	0.0	30.7	30.0	15.7	16.0
Incr Delay (d2), s/veh	3.2	0.0	10.2	3.2	0.3	0.1	3.8	0.0	0.6	0.2	0.0	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	0.0	11.9	1.2	2.5	0.5	0.4	0.0	0.7	1.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.9	0.0	44.1	45.8	14.7	3.6	51.6	0.0	31.3	30.2	15.7	16.1
LnGrp LOS	D	A	D	D	B	A	D	A	C	C	B	B
Approach Vol, veh/h		495			630			51			108	
Approach Delay, s/veh		44.4			16.2			37.3			25.9	
Approach LOS		D			B			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.7	27.0	10.5	33.8	7.2	48.5	8.5	35.8
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	10.5	22.5	8.5	40.5	8.5	24.5	8.5	40.5
Max Q Clear Time (g_c+I1), s	5.4	3.9	4.7	27.0	2.9	3.1	3.4	10.2
Green Ext Time (p_c), s	0.1	0.1	0.0	2.3	0.0	0.1	0.0	3.9

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	352	177	117	470	120	84
v/c Ratio	0.63	0.30	0.51	0.44	0.14	0.10
Control Delay	15.3	3.2	20.2	13.8	8.8	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	3.2	20.2	13.8	8.8	3.2
Queue Length 50th (ft)	107	17	26	54	17	0
Queue Length 95th (ft)	79	18	50	73	49	20
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	778	748	320	1478	878	826
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.24	0.37	0.32	0.14	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	292	147	105	423	0	0	0	0	115	0	81
Future Volume (veh/h)	0	292	147	105	423	0	0	0	0	115	0	81
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	352	177	117	470	0				120	0	84
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	649	538	316	1234	0				807	0	718
Arrive On Green	0.00	0.36	0.36	0.36	0.36	0.00				0.46	0.00	0.46
Sat Flow, veh/h	0	1826	1513	854	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	352	177	117	470	0				120	0	84
Grp Sat Flow(s),veh/h/ln	0	1826	1513	854	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	7.7	4.3	6.3	5.0	0.0				2.0	0.0	1.5
Cycle Q Clear(g_c), s	0.0	7.7	4.3	14.0	5.0	0.0				2.0	0.0	1.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	649	538	316	1234	0				807	0	718
V/C Ratio(X)	0.00	0.54	0.33	0.37	0.38	0.00				0.15	0.00	0.12
Avail Cap(c_a), veh/h	0	785	651	380	1492	0				807	0	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.55	0.55	0.92	0.92	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.9	11.8	18.5	12.0	0.0				7.7	0.0	7.6
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.7	0.2	0.0				0.4	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	2.6	1.2	1.1	1.6	0.0				0.7	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.2	11.9	19.1	12.2	0.0				8.1	0.0	7.9
LnGrp LOS	A	B	B	B	B	A				A	A	A
Approach Vol, veh/h		529			587						204	
Approach Delay, s/veh		12.8			13.6						8.0	
Approach LOS		B			B						A	

Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				22.3		27.7		22.3				
Change Period (Y+Rc), s				4.5		4.5		4.5				
Max Green Setting (Gmax), s				21.5		19.5		21.5				
Max Q Clear Time (g_c+I1), s				9.7		4.0		16.0				
Green Ext Time (p_c), s				2.1		0.8		1.8				

Intersection Summary			
HCM 6th Ctrl Delay			12.4
HCM 6th LOS			B

Mitigated Existing + Approved/Pending/Proposed + Project Phase 2 Roundabout PM

5: SR 41 NB Ramp & Bush Street

08/27/2019

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	72	395	463	238	258
v/c Ratio	0.27	0.67	0.40	0.27	0.29
Control Delay	7.7	15.2	10.3	9.9	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	15.2	10.3	9.9	2.7
Queue Length 50th (ft)	14	178	41	37	0
Queue Length 95th (ft)	19	141	56	91	34
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	362	785	1498	867	902
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.50	0.31	0.27	0.29

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 2 Roundabout PM
5: SR 41 NB Ramp & Bush Street

08/27/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	63	344	0	0	310	98	218	1	237	0	0	0
Future Volume (veh/h)	63	344	0	0	310	98	218	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	72	395	0	0	352	111	237	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	297	517	0	0	737	229	942	4	841			
Arrive On Green	0.19	0.19	0.00	0.00	0.28	0.28	0.54	0.54	0.54			
Sat Flow, veh/h	915	1841	0	0	2718	816	1746	7	1560			
Grp Volume(v), veh/h	72	395	0	0	233	230	238	0	258			
Grp Sat Flow(s),veh/h/ln	915	1841	0	0	1749	1694	1753	0	1560			
Q Serve(g_s), s	3.7	10.2	0.0	0.0	5.5	5.7	3.6	0.0	4.6			
Cycle Q Clear(g_c), s	9.4	10.2	0.0	0.0	5.5	5.7	3.6	0.0	4.6			
Prop In Lane	1.00		0.00	0.00		0.48	1.00		1.00			
Lane Grp Cap(c), veh/h	297	517	0	0	491	475	946	0	841			
V/C Ratio(X)	0.24	0.76	0.00	0.00	0.47	0.48	0.25	0.00	0.31			
Avail Cap(c_a), veh/h	434	792	0	0	752	728	946	0	841			
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.74	0.74	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	21.0	18.7	0.0	0.0	14.9	15.0	6.1	0.0	6.4			
Incr Delay (d2), s/veh	0.3	1.8	0.0	0.0	0.7	0.8	0.6	0.0	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			
%ile BackOfQ(50%),veh/ln	0.8	4.3	0.0	0.0	1.9	1.9	1.1	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	20.5	0.0	0.0	15.6	15.7	6.8	0.0	7.3			
LnGrp LOS	C	C	A	A	B	B	A	A	A			
Approach Vol, veh/h		467			463			496				
Approach Delay, s/veh		20.6			15.7			7.1				
Approach LOS		C			B			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		31.5		18.5				18.5				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		19.5		21.5				21.5				
Max Q Clear Time (g_c+I1), s		6.6		12.2				7.7				
Green Ext Time (p_c), s		1.9		1.9				2.3				

Intersection Summary			
HCM 6th Ctrl Delay			14.3
HCM 6th LOS			B

6: 19 1/2 Avenue & Bush Street

Intersection	
Intersection Delay, s/veh	13.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	217	241	123	18	189	16	91	57	19	16	42	128
Future Vol, veh/h	217	241	123	18	189	16	91	57	19	16	42	128
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	255	284	145	20	208	18	98	61	20	17	45	136
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Righ	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	15.3	12.4	12.4	12
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	80%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	20%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	57	19	217	241	123	18	126	79	16	42	128
LT Vol	91	0	0	217	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	241	0	0	126	63	0	42	0
RT Vol	0	0	19	0	0	123	0	0	16	0	0	128
Lane Flow Rate	98	61	20	255	284	145	20	138	87	17	45	136
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.224	0.132	0.04	0.506	0.522	0.239	0.044	0.286	0.176	0.039	0.096	0.265
Departure Headway (Hd)	8.224	7.724	7.024	7.134	6.634	5.934	7.924	7.424	7.283	8.217	7.717	7.017
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	436	465	510	508	547	609	452	485	493	436	465	512
Service Time	5.969	5.469	4.769	4.834	4.334	3.634	5.667	5.167	5.025	5.961	5.461	4.761
HCM Lane V/C Ratio	0.225	0.131	0.039	0.502	0.519	0.238	0.044	0.285	0.176	0.039	0.097	0.266
HCM Control Delay	13.3	11.6	10.1	16.9	16.3	10.5	11	13.1	11.6	11.3	11.3	12.3
HCM Lane LOS	B	B	B	C	C	B	B	B	B	B	B	B
HCM 95th-tile Q	0.8	0.5	0.1	2.8	3	0.9	0.1	1.2	0.6	0.1	0.3	1.1

APPENDIX W

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 CONDITIONS

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Intersection	
Int Delay, s/veh	26.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱			✥			✥	
Traffic Vol, veh/h	2	54	8	310	258	3	9	0	258	11	1	5
Future Vol, veh/h	2	54	8	310	258	3	9	0	258	11	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	58	58	58	45	45	45	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	68	10	534	445	5	20	0	573	20	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	450	0	0	78	0	0	1595	1592	68	1882	1600	448
Stage 1	-	-	-	-	-	-	74	74	-	1516	1516	-
Stage 2	-	-	-	-	-	-	1521	1518	-	366	84	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1110	-	-	1520	-	-	86	107	995	54	106	611
Stage 1	-	-	-	-	-	-	935	833	-	149	182	-
Stage 2	-	-	-	-	-	-	148	181	-	653	825	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1110	-	-	1520	-	-	60	69	995	~ 17	69	611
Mov Cap-2 Maneuver	-	-	-	-	-	-	60	69	-	~ 17	69	-
Stage 1	-	-	-	-	-	-	932	831	-	149	118	-
Stage 2	-	-	-	-	-	-	93	117	-	276	823	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.7	42	$ 481.8
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	652	1110	-	-	1520	-	-	25
HCM Lane V/C Ratio	0.91	0.002	-	-	0.352	-	-	1.214
HCM Control Delay (s)	42	8.3	0	-	8.6	-	-	$ 481.8
HCM Lane LOS	E	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	11.7	0	-	-	1.6	-	-	3.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	358	13	38	540	0	14	0	92	0	0	1
Future Vol, veh/h	0	358	13	38	540	0	14	0	92	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	675	25	66	931	0	25	0	167	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	931	0	0	700	0	0	1752	1751	688	1834	1763	931
Stage 1	-	-	-	-	-	-	688	688	-	1063	1063	-
Stage 2	-	-	-	-	-	-	1064	1063	-	771	700	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	735	-	-	897	-	-	67	86	446	59	84	324
Stage 1	-	-	-	-	-	-	436	447	-	270	300	-
Stage 2	-	-	-	-	-	-	270	300	-	393	441	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	735	-	-	897	-	-	59	73	446	33	71	324
Mov Cap-2 Maneuver	-	-	-	-	-	-	59	73	-	33	71	-
Stage 1	-	-	-	-	-	-	436	447	-	270	254	-
Stage 2	-	-	-	-	-	-	228	254	-	246	441	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	62.3	16.2
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	239	735	-	-	897	-	-	324
HCM Lane V/C Ratio	0.806	-	-	-	0.073	-	-	0.006
HCM Control Delay (s)	62.3	0	-	-	9.3	0	-	16.2
HCM Lane LOS	F	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	6.1	0	-	-	0.2	-	-	0

Existing + Approved/Pending/Proposed + Project Phase 3 AM
3: Belle Haven & Bush Street

08/24/2019

Intersection	
Intersection Delay, s/veh	177.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	27	408	15	20	526	45	8	0	39	52	0	44
Future Vol, veh/h	27	408	15	20	526	45	8	0	39	52	0	44
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	51	770	28	33	862	74	14	0	68	78	0	66
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	388.3	31.4	14.8	15.5
HCM LOS	F	D	B	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	6%	7%	0%	0%	100%	0%	0%
Vol Thru, %	0%	0%	91%	93%	98%	0%	0%	100%	0%
Vol Right, %	0%	100%	3%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	39	450	283	268	41	52	0	44
LT Vol	8	0	27	20	0	0	52	0	0
Through Vol	0	0	408	263	263	0	0	0	0
RT Vol	0	39	15	0	5	41	0	0	44
Lane Flow Rate	14	68	849	464	439	66	78	0	66
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.038	0.162	1.803	0.822	0.772	0.104	0.203	0	0.15
Departure Headway (Hd)	11.477	10.205	7.643	7.257	7.208	6.498	11.082	10.554	9.814
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	314	354	475	501	504	555	326	0	368
Service Time	9.177	7.905	5.413	4.957	4.908	4.198	8.782	8.254	7.514
HCM Lane V/C Ratio	0.045	0.192	1.787	0.926	0.871	0.119	0.239	0	0.179
HCM Control Delay	14.6	14.9	388.3	35.4	30.3	10	16.6	13.3	14.2
HCM Lane LOS	B	B	F	E	D	A	C	N	B
HCM 95th-tile Q	0.1	0.6	52.8	8	6.9	0.3	0.7	0	0.5

Intersection	
Int Delay, s/veh	43.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↗	↖	↑↑						↰↑	↗
Traffic Vol, veh/h	0	321	178	286	491	0	0	0	0	59	0	100
Future Vol, veh/h	0	321	178	286	491	0	0	0	0	59	0	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	58	58	58	81	81	81	25	25	25	74	74	74
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	553	307	353	606	0	0	0	0	80	0	135

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	860	0	0				2020	2172	304
Stage 1	-	-	-	-	-	-				1312	1312	-
Stage 2	-	-	-	-	-	-				708	860	-
Critical Hdwy	-	-	-	4.16	-	-				6.66	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-				5.86	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.46	5.56	-
Follow-up Hdwy	-	-	-	2.238	-	-				3.538	4.038	3.338
Pot Cap-1 Maneuver	0	-	-	769	-	0				~ 56	45	688
Stage 1	0	-	-	-	-	0				214	224	-
Stage 2	0	-	-	-	-	0				483	368	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	769	-	-				~ 30	0	687
Mov Cap-2 Maneuver	-	-	-	-	-	-				~ 30	0	-
Stage 1	-	-	-	-	-	-				214	0	-
Stage 2	-	-	-	-	-	-				261	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	5	$ 389.3
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	769	-	30	687
HCM Lane V/C Ratio	-	-	0.459	-	2.658	0.197
HCM Control Delay (s)	-	-	13.6	-	$ 1029.6	11.5
HCM Lane LOS	-	-	B	-	F	B
HCM 95th %tile Q(veh)	-	-	2.4	-	9.4	0.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	35.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	74	306	0	0	592	158	185	2	82	0	0	0
Future Vol, veh/h	74	306	0	0	592	158	185	2	82	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	82	82	82	74	74	74	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	121	502	0	0	722	193	250	3	111	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	915	0	-	-	-	0	1105	1659	502
Stage 1	-	-	-	-	-	-	744	744	-
Stage 2	-	-	-	-	-	-	361	915	-
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.245
Critical Hdwy Stg 1	-	-	-	-	-	-	5.445	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.845	5.545	-
Follow-up Hdwy	2.2285	-	-	-	-	-	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	738	-	0	0	-	-	~ 217	96	566
Stage 1	-	-	0	0	-	-	466	419	-
Stage 2	-	-	0	0	-	-	674	349	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	738	-	-	-	-	-	~ 181	0	566
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 181	0	-
Stage 1	-	-	-	-	-	-	390	0	-
Stage 2	-	-	-	-	-	-	674	0	-

Approach	EB	WB	NB
HCM Control Delay, s	2.1	0	182.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	181	566	738	-	-	-
HCM Lane V/C Ratio	1.396	0.196	0.164	-	-	-
HCM Control Delay (s)	257	12.9	10.8	-	-	-
HCM Lane LOS	F	B	B	-	-	-
HCM 95th %tile Q(veh)	15.2	0.7	0.6	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Intersection Delay, s/veh	37.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	106	198	84	22	253	22	194	53	19	32	59	303
Future Vol, veh/h	106	198	84	22	253	22	194	53	19	32	59	303
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	196	367	156	26	294	26	277	76	27	36	67	344
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	42.1	21.7	37.2	42.6
HCM LOS	E	C	E	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	79%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	21%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	194	53	19	106	198	84	22	169	106	32	59
LT Vol	194	0	0	106	0	0	22	0	0	32	0
Through Vol	0	53	0	0	198	0	0	169	84	0	59
RT Vol	0	0	19	0	0	84	0	0	22	0	0
Lane Flow Rate	277	76	27	196	367	156	26	196	124	36	67
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.807	0.21	0.07	0.532	0.942	0.369	0.076	0.554	0.345	0.105	0.184
Departure Headway (Hd)	10.486	9.986	9.286	9.748	9.248	8.548	10.678	10.178	10.033	10.381	9.881
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	344	358	384	369	392	420	335	353	357	344	362
Service Time	8.281	7.781	7.081	7.531	7.031	6.331	8.474	7.974	7.829	8.171	7.671
HCM Lane V/C Ratio	0.805	0.212	0.07	0.531	0.936	0.371	0.078	0.555	0.347	0.105	0.185
HCM Control Delay	45.5	15.4	12.8	23.2	63.2	16.3	14.4	25	18.1	14.4	14.9
HCM Lane LOS	E	C	B	C	F	C	B	C	C	B	B
HCM 95th-tile Q	6.8	0.8	0.2	3	10.4	1.7	0.2	3.2	1.5	0.3	0.7

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱			✥			✥	
Traffic Vol, veh/h	7	175	10	175	159	9	7	0	143	9	1	3
Future Vol, veh/h	7	175	10	175	159	9	7	0	143	9	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	80	394	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	65	65	65	65	65	65	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	211	12	269	245	14	11	0	220	13	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	223	0	0	1022	1024	213	1135	1029	254
Stage 1	-	-	-	-	-	-	227	227	-	790	790	-
Stage 2	-	-	-	-	-	-	795	797	-	345	239	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1306	-	-	1346	-	-	214	235	827	179	234	785
Stage 1	-	-	-	-	-	-	776	716	-	383	402	-
Stage 2	-	-	-	-	-	-	381	399	-	671	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1306	-	-	1346	-	-	178	187	825	110	186	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	178	187	-	110	186	-
Stage 1	-	-	-	-	-	-	771	711	-	380	322	-
Stage 2	-	-	-	-	-	-	301	319	-	488	703	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.3	12.6	33.8
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	705	1306	-	-	1346	-	-	143
HCM Lane V/C Ratio	0.327	0.006	-	-	0.2	-	-	0.126
HCM Control Delay (s)	12.6	7.8	0	-	8.3	-	-	33.8
HCM Lane LOS	B	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	1.4	0	-	-	0.7	-	-	0.4

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	328	10	157	355	0	23	0	81	0	0	2
Future Vol, veh/h	0	328	10	157	355	0	23	0	81	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	426	13	242	546	0	32	0	114	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	546	0	0	439	0	0	1465	1463	433	1520	1469	546
Stage 1	-	-	-	-	-	-	433	433	-	1030	1030	-
Stage 2	-	-	-	-	-	-	1032	1030	-	490	439	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1023	-	-	1121	-	-	106	129	623	97	127	538
Stage 1	-	-	-	-	-	-	601	582	-	282	311	-
Stage 2	-	-	-	-	-	-	281	311	-	560	578	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1023	-	-	1121	-	-	80	89	623	60	88	538
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	89	-	60	88	-
Stage 1	-	-	-	-	-	-	601	582	-	282	215	-
Stage 2	-	-	-	-	-	-	193	215	-	457	578	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.8	38.2	11.7
HCM LOS			E	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	249	1023	-	-	1121	-	-	538
HCM Lane V/C Ratio	0.588	-	-	-	0.215	-	-	0.005
HCM Control Delay (s)	38.2	0	-	-	9.1	0	-	11.7
HCM Lane LOS	E	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	3.4	0	-	-	0.8	-	-	0

Existing + Approved/Pending/Proposed + Projects Phase 3 PM
3: Belle Haven & Bush Street

08/24/2019

Intersection	
Intersection Delay, s/veh	33.7
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰↑↱	↱	↰	↑↱		↰	↑	↱
Traffic Vol, veh/h	20	377	12	40	474	46	14	1	31	57	2	24
Future Vol, veh/h	20	377	12	40	474	46	14	1	31	57	2	24
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	26	490	16	50	593	58	16	1	35	75	3	32
Number of Lanes	0	1	0	0	2	1	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	3	1
HCM Control Delay	64	15.5	11.7	12.9
HCM LOS	F	C	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	5%	14%	0%	0%	100%	0%	0%
Vol Thru, %	0%	3%	92%	86%	98%	0%	0%	100%	0%
Vol Right, %	0%	97%	3%	0%	2%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	14	32	409	277	242	41	57	2	24
LT Vol	14	0	20	40	0	0	57	0	0
Through Vol	0	1	377	237	237	0	0	2	0
RT Vol	0	31	12	0	5	41	0	0	24
Lane Flow Rate	16	36	531	346	302	52	75	3	32
Geometry Grp	8	8	8	7	7	7	8	8	8
Degree of Util (X)	0.04	0.08	0.996	0.586	0.504	0.076	0.187	0.006	0.068
Departure Headway (Hd)	9.262	8.042	6.752	6.09	6.004	5.307	8.994	8.479	7.758
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	389	448	536	589	595	669	401	425	465
Service Time	6.968	5.748	4.539	3.87	3.783	3.086	6.696	6.181	5.46
HCM Lane V/C Ratio	0.041	0.08	0.991	0.587	0.508	0.078	0.187	0.007	0.069
HCM Control Delay	12.4	11.4	64	17.2	14.8	8.5	13.8	11.2	11
HCM Lane LOS	B	B	F	C	B	A	B	B	B
HCM 95th-tile Q	0.1	0.3	13.9	3.8	2.8	0.2	0.7	0	0.2

4: SR 41 SB Ramp & Bush Street

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	0	310	155	105	468	0	0	0	0	115	0	92
Future Vol, veh/h	0	310	155	105	468	0	0	0	0	115	0	92
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	249	-	-	-	-	-	-	-	466
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	90	90	90	92	92	92	96	96	96
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	373	187	117	520	0	0	0	0	120	0	96

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	560	0	0				1221	1314	260
Stage 1	-	-	-	-	-	-				754	754	-
Stage 2	-	-	-	-	-	-				467	560	-
Critical Hdwy	-	-	-	4.175	-	-				6.675	6.575	6.975
Critical Hdwy Stg 1	-	-	-	-	-	-				5.875	5.575	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.475	5.575	-
Follow-up Hdwy	-	-	-	2.2475	-	-				3.5475	4.0475	3.3475
Pot Cap-1 Maneuver	0	-	-	991	-	0				181	154	732
Stage 1	0	-	-	-	-	0				420	410	-
Stage 2	0	-	-	-	-	0				622	504	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	991	-	-				160	0	732
Mov Cap-2 Maneuver	-	-	-	-	-	-				160	0	-
Stage 1	-	-	-	-	-	-				420	0	-
Stage 2	-	-	-	-	-	-				549	0	-

Approach	EB			WB						SB
HCM Control Delay, s	0			1.7						46.3
HCM LOS										E

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	991	-	160	732
HCM Lane V/C Ratio	-	-	0.118	-	0.749	0.131
HCM Control Delay (s)	-	-	9.1	-	74.8	10.7
HCM Lane LOS	-	-	A	-	F	B
HCM 95th %tile Q(veh)	-	-	0.4	-	4.6	0.4

Intersection	
Int Delay, s/veh	11.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Vol, veh/h	68	357	0	0	327	98	246	1	237	0	0	0
Future Vol, veh/h	68	357	0	0	327	98	246	1	237	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	114	-	-	-	-	-	-	-	300	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	88	88	88	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	78	410	0	0	372	111	267	1	258	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	483	0	-	-	-	0	752	1049	410
Stage 1	-	-	-	-	-	-	566	566	-
Stage 2	-	-	-	-	-	-	186	483	-
Critical Hdwy	4.16	-	-	-	-	-	6.66	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.86	5.56	-
Follow-up Hdwy	2.238	-	-	-	-	-	3.538	4.038	3.338
Pot Cap-1 Maneuver	1066	-	0	0	-	-	358	224	636
Stage 1	-	-	0	0	-	-	562	502	-
Stage 2	-	-	0	0	-	-	823	548	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1066	-	-	-	-	-	332	0	636
Mov Cap-2 Maneuver	-	-	-	-	-	-	332	0	-
Stage 1	-	-	-	-	-	-	521	0	-
Stage 2	-	-	-	-	-	-	823	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.4	0	32.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	332	636	1066	-	-	-
HCM Lane V/C Ratio	0.809	0.405	0.073	-	-	-
HCM Control Delay (s)	48.9	14.5	8.6	-	-	-
HCM Lane LOS	E	B	A	-	-	-
HCM 95th %tile Q(veh)	6.8	2	0.2	-	-	-

Intersection	
Intersection Delay, s/veh	14.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	218	251	125	18	202	16	93	57	19	16	42	130
Future Vol, veh/h	218	251	125	18	202	16	93	57	19	16	42	130
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	256	295	147	20	222	18	100	61	20	17	45	138
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	15.9	12.8	12.6	12.2
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	81%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	19%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	57	19	218	251	125	18	135	83	16	42
LT Vol	93	0	0	218	0	0	18	0	0	16	0
Through Vol	0	57	0	0	251	0	0	135	67	0	42
RT Vol	0	0	19	0	0	125	0	0	16	0	0
Lane Flow Rate	100	61	20	256	295	147	20	148	92	17	45
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.231	0.133	0.04	0.513	0.55	0.245	0.044	0.308	0.187	0.039	0.097
Departure Headway (Hd)	8.328	7.828	7.128	7.202	6.702	6.002	7.997	7.497	7.362	8.318	7.818
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	432	458	502	503	540	601	448	479	488	431	458
Service Time	6.072	5.572	4.872	4.902	4.402	3.702	5.736	5.236	5.101	6.062	5.562
HCM Lane V/C Ratio	0.231	0.133	0.04	0.509	0.546	0.245	0.045	0.309	0.189	0.039	0.098
HCM Control Delay	13.6	11.8	10.2	17.2	17.3	10.6	11.1	13.6	11.8	11.4	11.4
HCM Lane LOS	B	B	B	C	C	B	B	B	B	B	B
HCM 95th-tile Q	0.9	0.5	0.1	2.9	3.3	1	0.1	1.3	0.7	0.1	0.3

APPENDIX X

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 CONDITIONS

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: COLLEGE Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

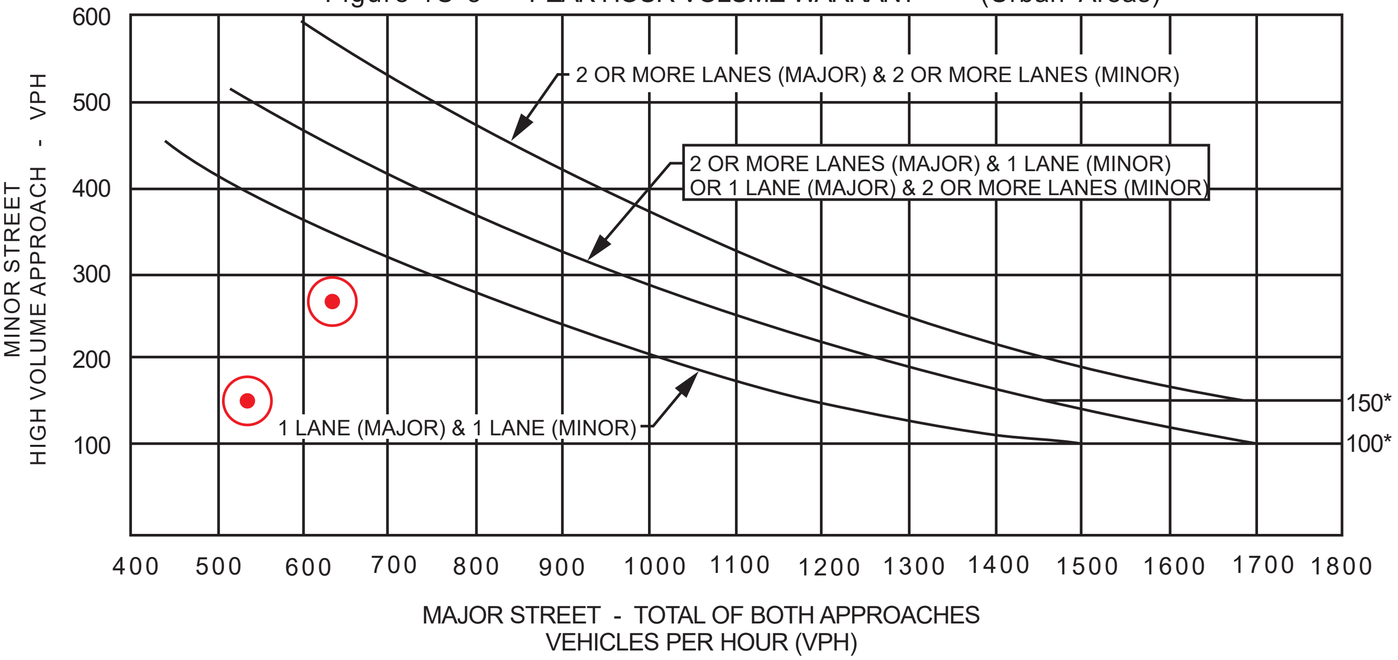
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	635	535			
Highest Approaches - Minor Street	✓		267	150			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 40 mph

MINOR STREET: SEMAS Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ---------------- ☐

or RURAL (R)

In built up area of isolated community of < 10,000 pop. --------- ☐

☒ URBAN (U)

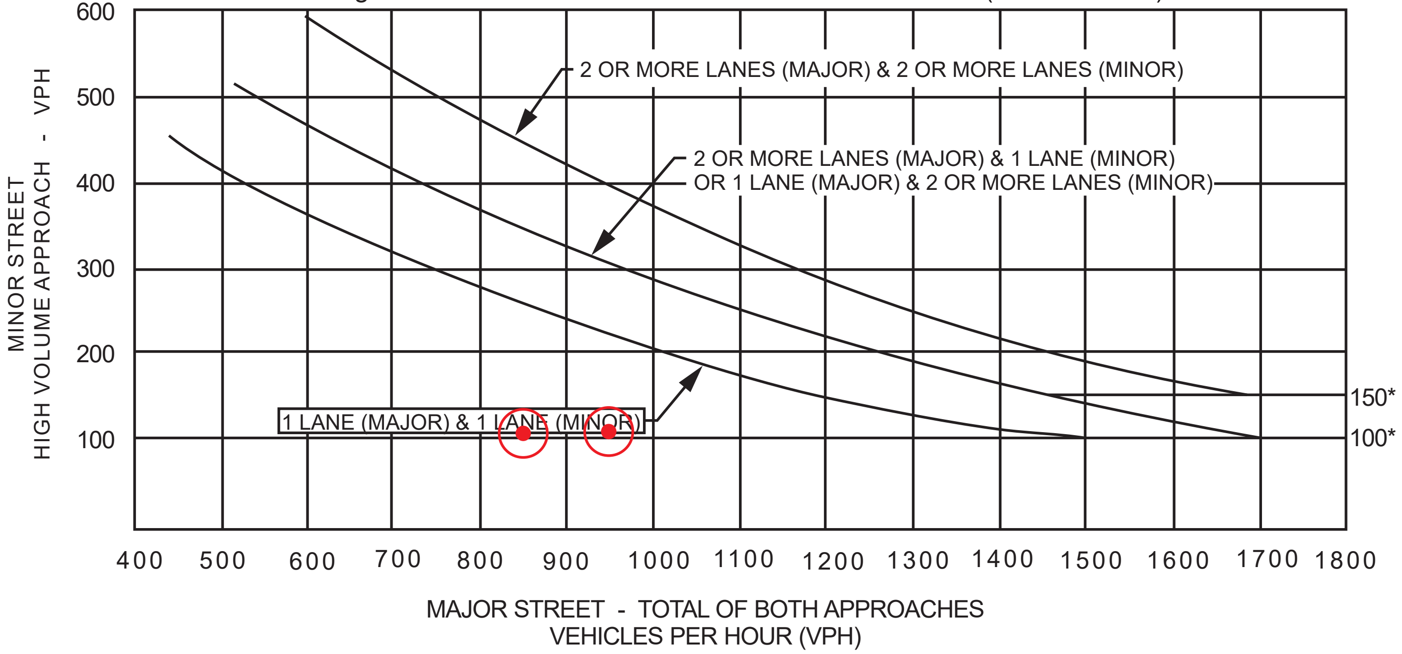
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street	✓		948	849			
Highest Approaches - Minor Street	✓		107	104			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: BELLE HAVEN Critical Approach Speed 25 mph

Critical speed of major street traffic > 40 mph ☐ or

In built up area of isolated community of < 10,000 pop. ☐ RURAL (R)

☒ URBAN (U)

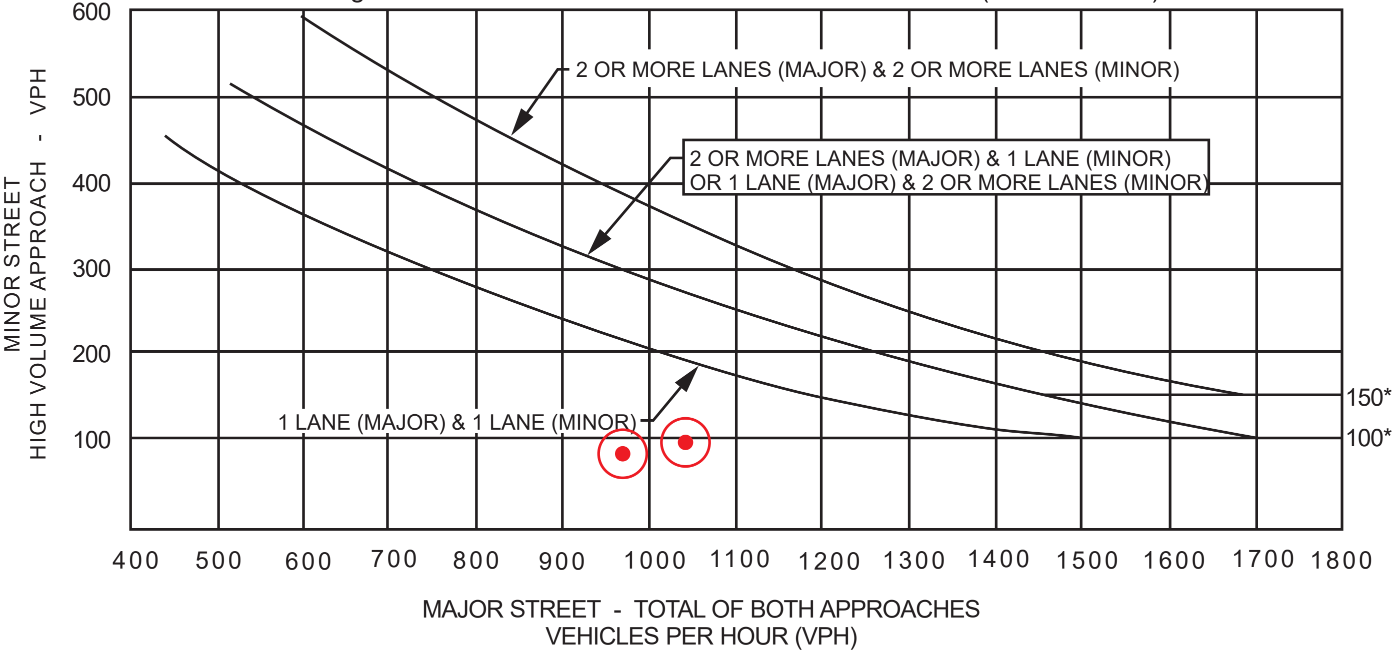
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1042	969			
Highest Approaches - Minor Street	✓		96	83			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 SB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1276	1038			
Highest Approaches - Minor Street	✓		159	207			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)

* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH NPS mph

MINOR STREET: SR 41 NB RAMPS Critical Approach Speed NPS mph

Critical speed of major street traffic > 40 mph ☐ or RURAL (R)

In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

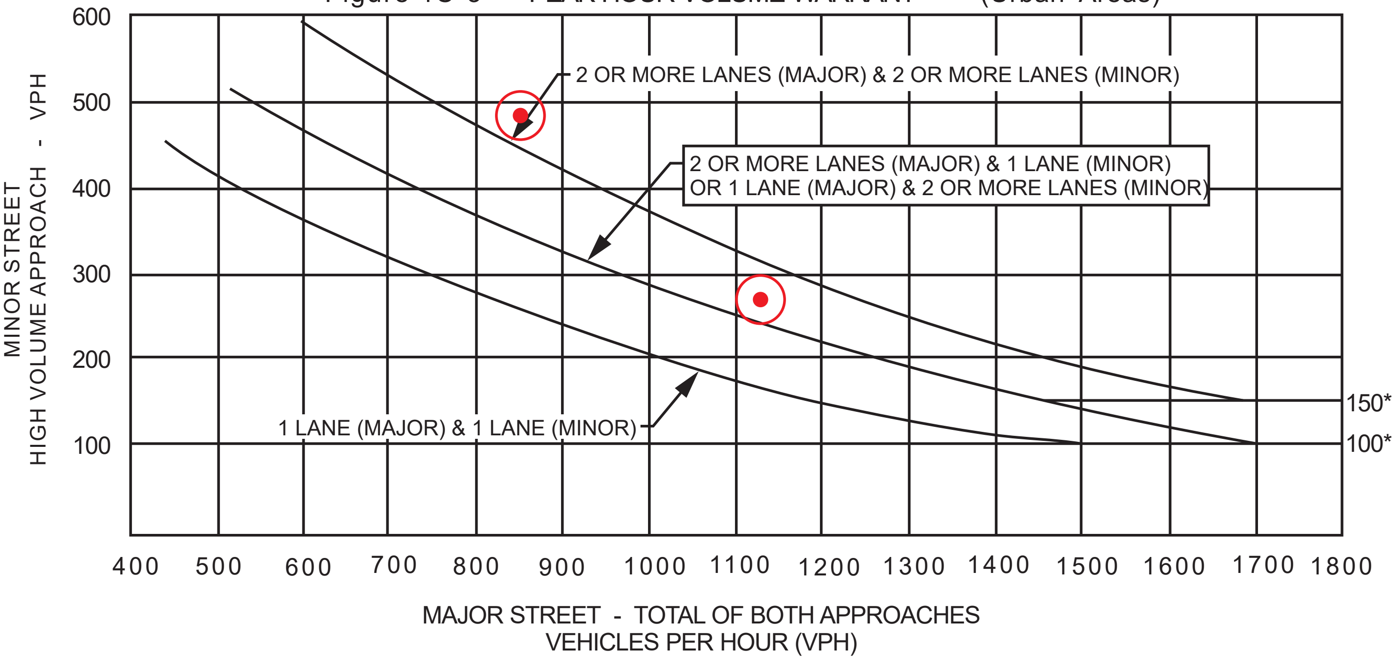
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☒ NO ☐

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	1130	850			
Highest Approaches - Minor Street		✓	269	484			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

TRAFFIC SIGNAL WARRANTS

CALC RD DATE 08/25/19 CHK RD DATE 08/25/19

MAJOR STREET: BUSH 35 mph

MINOR STREET: 19 1/2 AVENUE Critical Approach Speed 35 mph

Critical speed of major street traffic > 40 mph ☐
or RURAL (R)
In built up area of isolated community of < 10,000 pop. ☐

☒ URBAN (U)

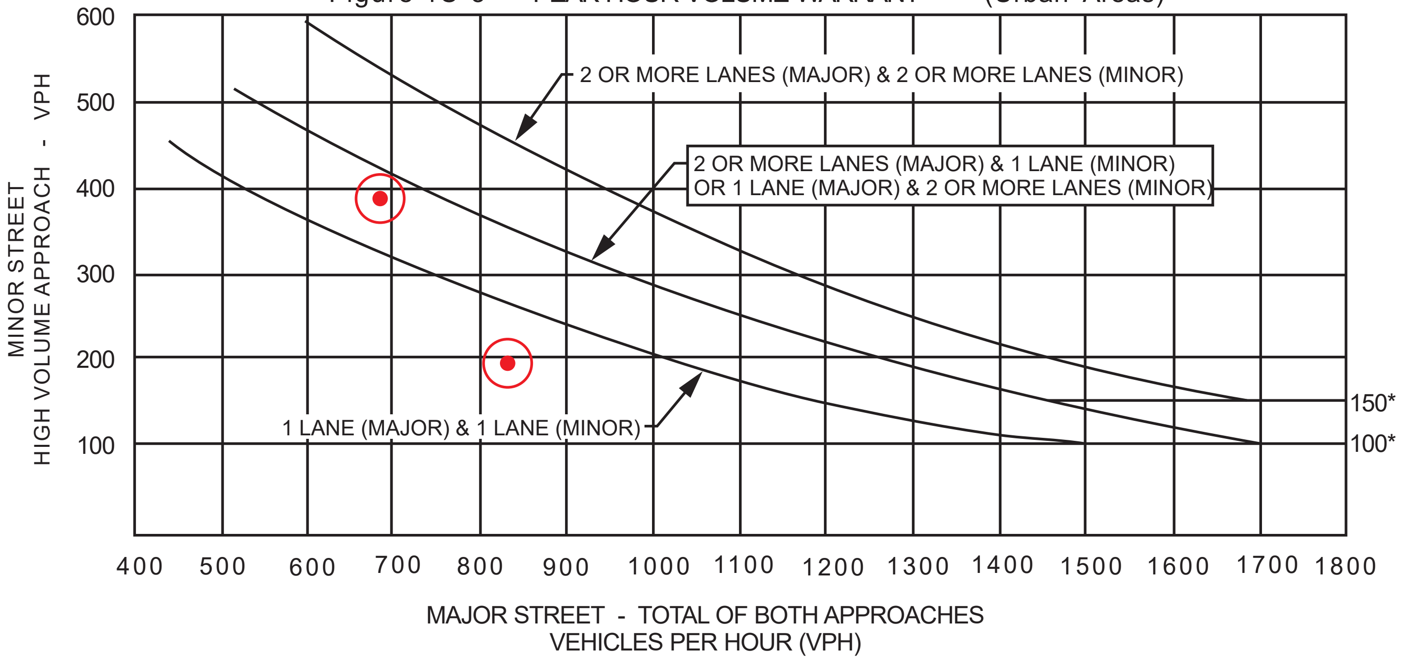
CONDITION: EXISTING (2018) + APPROVED/PENDING/PROPOSED PROJECTS + PROJECT (Phase 1, 2, & 3 - 370 DU)

WARRANT 3 - Peak Hour Volume SATISFIED* YES ☐ NO ☒

Approach Lanes	One	2 or more	AM PEAK	PM PEAK			
Both Approaches - Major Street		✓	685	831			
Highest Approaches - Minor Street	✓		394	188			

* Refer to Fig. 4C-3 (URBAN AREAS) or Fig. 4C-4 (RURAL AREAS) to determine if this warrant is satisfied.

Figure 4C-3 PEAK HOUR VOLUME WARRANT (Urban Areas)



* 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 APPROACHING WITH ONE LANE.

The satisfaction of a warant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right of way assignment must be shown.

APPENDIX Y

MITIGATED

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 CONDITIONS

ALTERNATIVE A

INTERSECTION LEVELS OF SERVICE CALCULATIONS

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 AM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	12.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↑↱			↰	↱		↰↑↱	
Traffic Vol, veh/h	2	54	8	310	258	3	9	0	258	11	1	5
Future Vol, veh/h	2	54	8	310	258	3	9	0	258	11	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	394	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	58	58	58	45	45	45	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	68	10	534	445	5	20	0	573	20	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	450	0	0	78	0	0	1371	1597	39	1556	1600	225
Stage 1	-	-	-	-	-	-	79	79	-	1516	1516	-
Stage 2	-	-	-	-	-	-	1292	1518	-	40	84	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1107	-	-	1518	-	-	105	105	1024	77	105	778
Stage 1	-	-	-	-	-	-	921	829	-	125	180	-
Stage 2	-	-	-	-	-	-	172	180	-	970	824	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1107	-	-	1518	-	-	74	68	1024	25	68	778
Mov Cap-2 Maneuver	-	-	-	-	-	-	74	68	-	25	68	-
Stage 1	-	-	-	-	-	-	918	827	-	125	117	-
Stage 2	-	-	-	-	-	-	109	117	-	426	822	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.7	14.9	255.7
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	74	1024	1107	-	-	1518	-	-	37
HCM Lane V/C Ratio	0.27	0.56	0.002	-	-	0.352	-	-	0.82
HCM Control Delay (s)	70.8	12.9	8.3	0	-	8.7	-	-	255.7
HCM Lane LOS	F	B	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	1	3.6	0	-	-	1.6	-	-	3

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✥			✥	
Traffic Vol, veh/h	0	358	13	38	540	0	14	0	92	0	0	1
Future Vol, veh/h	0	358	13	38	540	0	14	0	92	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	675	25	66	931	0	25	0	167	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	931	0	0	700	0	0	1286	1751	350	1401	1763	466
Stage 1	-	-	-	-	-	-	688	688	-	1063	1063	-
Stage 2	-	-	-	-	-	-	598	1063	-	338	700	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	731	-	-	893	-	-	122	85	646	100	83	543
Stage 1	-	-	-	-	-	-	403	445	-	238	298	-
Stage 2	-	-	-	-	-	-	456	298	-	650	440	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	731	-	-	893	-	-	107	72	646	65	70	543
Mov Cap-2 Maneuver	-	-	-	-	-	-	107	72	-	65	70	-
Stage 1	-	-	-	-	-	-	403	445	-	238	252	-
Stage 2	-	-	-	-	-	-	385	252	-	482	440	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	23.1	11.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	388	731	-	-	893	-	-	543
HCM Lane V/C Ratio	0.497	-	-	-	0.073	-	-	0.003
HCM Control Delay (s)	23.1	0	-	-	9.3	0.6	-	11.7
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	2.7	0	-	-	0.2	-	-	0

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 AM
3: Belle Haven & Bush Street

08/24/2019

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	51	798	33	862	74	14	68	78	66
v/c Ratio	0.36	0.97	0.24	0.58	0.10	0.10	0.11	0.48	0.09
Control Delay	51.3	52.6	36.1	14.5	0.4	44.5	0.3	53.3	0.2
Queue Delay	0.0	3.2	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	55.7	36.1	15.1	0.4	44.5	0.3	53.3	0.2
Queue Length 50th (ft)	31	483	21	105	0	8	0	48	0
Queue Length 95th (ft)	40	285	33	77	0	18	0	69	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	141	824	140	1555	743	140	632	178	773
Starvation Cap Reductn	0	0	0	323	0	0	0	0	0
Spillback Cap Reductn	0	15	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.99	0.24	0.70	0.10	0.10	0.11	0.44	0.09

Intersection Summary

3: Belle Haven & Bush Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	27	408	15	20	526	45	8	0	39	52	0	44
Future Volume (veh/h)	27	408	15	20	526	45	8	0	39	52	0	44
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	51	770	28	33	862	74	14	0	68	78	0	66
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	106	785	29	84	1512	659	200	0	298	238	392	332
Arrive On Green	0.06	0.44	0.44	0.10	0.86	0.86	0.11	0.00	0.19	0.14	0.00	0.21
Sat Flow, veh/h	1753	1765	64	1753	3497	1523	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	51	0	798	33	862	74	14	0	68	78	0	66
Grp Sat Flow(s),veh/h/ln	1753	0	1829	1753	1749	1523	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	2.8	0.0	43.0	1.8	6.6	0.4	0.7	0.0	3.7	4.0	0.0	2.8
Cycle Q Clear(g_c), s	2.8	0.0	43.0	1.8	6.6	0.4	0.7	0.0	3.7	4.0	0.0	2.8
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	106	0	814	84	1512	659	200	0	298	238	392	332
V/C Ratio(X)	0.48	0.00	0.98	0.39	0.57	0.11	0.07	0.00	0.23	0.33	0.00	0.20
Avail Cap(c_a), veh/h	142	0	814	142	1556	678	200	0	298	238	392	332
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.4	0.0	27.3	43.8	4.3	1.4	39.6	0.0	34.2	39.1	0.0	21.1
Incr Delay (d2), s/veh	3.3	0.0	26.6	2.9	0.5	0.1	0.1	0.0	1.8	0.8	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	23.1	0.8	1.5	0.2	0.3	0.0	1.5	1.7	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	54.0	46.7	4.7	1.5	39.7	0.0	36.0	39.9	0.0	22.5
LnGrp LOS	D	A	D	D	A	A	D	A	D	D	A	C
Approach Vol, veh/h		849			969			82			144	
Approach Delay, s/veh		53.7			5.9			36.6			31.9	
Approach LOS		D			A			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.1	23.6	9.3	49.0	15.9	25.8	10.6	47.7
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	10.3	19.1	8.1	44.5	8.1	21.3	8.1	44.5
Max Q Clear Time (g_c+I1), s	6.0	5.7	3.8	45.0	2.7	4.8	4.8	8.6
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	7.3

Intersection Summary			
HCM 6th Ctrl Delay			28.8
HCM 6th LOS			C

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	553	307	353	606	80	135
v/c Ratio	0.86	0.41	0.83	0.27	0.17	0.27
Control Delay	16.0	1.5	49.5	3.3	33.7	7.8
Queue Delay	4.1	0.5	0.0	0.0	0.0	0.0
Total Delay	20.1	2.1	49.5	3.3	33.7	7.8
Queue Length 50th (ft)	133	0	200	18	41	0
Queue Length 95th (ft)	69	0	283	51	70	27
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	721	799	494	2516	462	508
Starvation Cap Reductn	103	204	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.52	0.71	0.24	0.17	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰↑	↱
Traffic Volume (veh/h)	0	321	178	286	491	0	0	0	0	59	0	100
Future Volume (veh/h)	0	321	178	286	491	0	0	0	0	59	0	100
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	553	307	353	606	0				80	0	135
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	619	525	390	2112	0				537	0	477
Arrive On Green	0.00	0.34	0.34	0.22	0.60	0.00				0.31	0.00	0.31
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1558
Grp Volume(v), veh/h	0	553	307	353	606	0				80	0	135
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1558
Q Serve(g_s), s	0.0	28.5	16.3	19.6	8.3	0.0				3.3	0.0	6.6
Cycle Q Clear(g_c), s	0.0	28.5	16.3	19.6	8.3	0.0				3.3	0.0	6.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	619	525	390	2112	0				537	0	477
V/C Ratio(X)	0.00	0.89	0.58	0.91	0.29	0.00				0.15	0.00	0.28
Avail Cap(c_a), veh/h	0	727	616	500	2536	0				537	0	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.26	0.26	0.52	0.52	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	31.5	27.4	37.9	9.5	0.0				25.2	0.0	26.4
Incr Delay (d2), s/veh	0.0	3.7	0.3	10.0	0.0	0.0				0.6	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.7	5.9	9.3	2.9	0.0				1.5	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	35.1	27.7	47.9	9.5	0.0				25.8	0.0	27.8
LnGrp LOS	A	D	C	D	A	A				C	A	C
Approach Vol, veh/h		860			959						215	
Approach Delay, s/veh		32.5			23.6						27.1	
Approach LOS		C			C						C	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			26.7	38.1		35.1		64.9				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			28.5	39.5		18.5		72.5				
Max Q Clear Time (g_c+I1), s			21.6	30.5		8.6		10.3				
Green Ext Time (p_c), s			0.6	3.1		0.6		4.6				
Intersection Summary												
HCM 6th Ctrl Delay			27.7									
HCM 6th LOS			C									

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 AM
5: SR 41 NB Ramp & Bush Street

08/24/2019

	↗	→	←	↑	↗
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	121	502	915	253	111
v/c Ratio	0.58	0.54	0.79	0.35	0.16
Control Delay	26.3	4.9	33.5	24.6	5.5
Queue Delay	0.0	0.1	0.0	0.0	0.0
Total Delay	26.3	5.0	33.5	24.6	5.5
Queue Length 50th (ft)	65	69	262	110	0
Queue Length 95th (ft)	69	0	263	162	22
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	271	1116	1391	718	706
Starvation Cap Reductn	0	85	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.49	0.66	0.35	0.16

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	74	306	0	0	592	158	185	2	82	0	0	0
Future Volume (veh/h)	74	306	0	0	592	158	185	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	121	502	0	0	722	193	250	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	149	825	0	0	862	231	813	10	732			
Arrive On Green	0.17	0.89	0.00	0.00	0.32	0.32	0.47	0.47	0.47			
Sat Flow, veh/h	1767	1856	0	0	2829	731	1747	21	1572			
Grp Volume(v), veh/h	121	502	0	0	465	450	253	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1705	1768	0	1572			
Q Serve(g_s), s	6.6	6.5	0.0	0.0	24.5	24.5	8.9	0.0	4.1			
Cycle Q Clear(g_c), s	6.6	6.5	0.0	0.0	24.5	24.5	8.9	0.0	4.1			
Prop In Lane	1.00		0.00	0.00		0.43	0.99		1.00			
Lane Grp Cap(c), veh/h	149	825	0	0	556	537	823	0	732			
V/C Ratio(X)	0.81	0.61	0.00	0.00	0.84	0.84	0.31	0.00	0.15			
Avail Cap(c_a), veh/h	274	1123	0	0	714	691	823	0	732			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.40	0.40	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	40.8	3.4	0.0	0.0	31.9	31.9	16.7	0.0	15.4			
Incr Delay (d2), s/veh	4.3	0.3	0.0	0.0	6.9	7.1	1.0	0.0	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			
%ile BackOfQ(50%),veh/ln	2.8	1.4	0.0	0.0	11.1	10.8	3.7	0.0	1.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	3.7	0.0	0.0	38.7	39.0	17.6	0.0	15.8			
LnGrp LOS	D	A	A	A	D	D	B	A	B			
Approach Vol, veh/h		623			915			364				
Approach Delay, s/veh		11.8			38.9			17.1				
Approach LOS		B			D			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		51.0		49.0			12.9	36.0				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		30.5		60.5			15.5	40.5				
Max Q Clear Time (g_c+I1), s		10.9		8.5			8.6	26.5				
Green Ext Time (p_c), s		1.8		3.5			0.1	5.0				
Intersection Summary												
HCM 6th Ctrl Delay			25.8									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	31.3
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	106	198	84	22	253	22	194	53	19	32	59	303
Future Vol, veh/h	106	198	84	22	253	22	194	53	19	32	59	303
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	196	367	156	26	294	26	277	76	27	36	67	344
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	26.4	21.6	36.8	42
HCM LOS	D	C	E	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	44%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	56%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	194	53	19	106	132	150	22	169	106	32	59	303
LT Vol	194	0	0	106	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	132	66	0	169	84	0	59	0
RT Vol	0	0	19	0	0	84	0	0	22	0	0	303
Lane Flow Rate	277	76	27	196	244	278	26	196	124	36	67	344
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.804	0.209	0.07	0.531	0.627	0.682	0.076	0.552	0.343	0.104	0.183	0.874
Departure Headway (Hd)	10.447	9.947	9.247	9.732	9.232	8.84	10.638	10.138	9.993	10.342	9.842	9.142
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	346	360	386	369	391	408	336	355	359	346	363	396
Service Time	8.239	7.739	7.039	7.513	7.013	6.621	8.432	7.932	7.787	8.132	7.632	6.932
HCM Lane V/C Ratio	0.801	0.211	0.07	0.531	0.624	0.681	0.077	0.552	0.345	0.104	0.185	0.869
HCM Control Delay	45	15.4	12.7	23.1	26.4	28.7	14.3	24.8	18	14.3	14.8	50.2
HCM Lane LOS	E	C	B	C	D	D	B	C	C	B	B	F
HCM 95th-tile Q	6.8	0.8	0.2	3	4.1	4.9	0.2	3.2	1.5	0.3	0.7	8.6

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 PM
1: College Avenue & Bush Street

08/24/2019

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↑↱			↰	↱		✥	
Traffic Vol, veh/h	7	175	10	175	159	9	7	0	143	9	1	3
Future Vol, veh/h	7	175	10	175	159	9	7	0	143	9	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	394	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	65	65	65	65	65	65	72	72	72
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	211	12	269	245	14	11	0	220	13	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	223	0	0	896	1030	114	914	1029	132
Stage 1	-	-	-	-	-	-	233	233	-	790	790	-
Stage 2	-	-	-	-	-	-	663	797	-	124	239	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1303	-	-	1343	-	-	235	232	917	228	232	893
Stage 1	-	-	-	-	-	-	749	711	-	350	400	-
Stage 2	-	-	-	-	-	-	417	397	-	867	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1303	-	-	1343	-	-	195	184	915	145	184	891
Mov Cap-2 Maneuver	-	-	-	-	-	-	195	184	-	145	184	-
Stage 1	-	-	-	-	-	-	744	706	-	348	320	-
Stage 2	-	-	-	-	-	-	330	318	-	653	701	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	4.3	10.9	26.8
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	195	915	1303	-	-	1343	-	-	183
HCM Lane V/C Ratio	0.055	0.24	0.006	-	-	0.2	-	-	0.099
HCM Control Delay (s)	24.5	10.2	7.8	0	-	8.4	-	-	26.8
HCM Lane LOS	C	B	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	0.2	0.9	0	-	-	0.7	-	-	0.3

2: Semas Drive & Bush Street

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✥			✥	
Traffic Vol, veh/h	0	328	10	157	355	0	23	0	81	0	0	2
Future Vol, veh/h	0	328	10	157	355	0	23	0	81	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	426	13	242	546	0	32	0	114	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	546	0	0	439	0	0	1190	1463	220	1243	1469	273
Stage 1	-	-	-	-	-	-	433	433	-	1030	1030	-
Stage 2	-	-	-	-	-	-	757	1030	-	213	439	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1019	-	-	1117	-	-	143	127	784	131	126	725
Stage 1	-	-	-	-	-	-	571	580	-	250	309	-
Stage 2	-	-	-	-	-	-	366	309	-	769	576	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1019	-	-	1117	-	-	108	88	784	85	87	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	108	88	-	85	87	-
Stage 1	-	-	-	-	-	-	571	580	-	250	213	-
Stage 2	-	-	-	-	-	-	251	213	-	657	576	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.3	24.4	10
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	329	1019	-	-	1117	-	-	725
HCM Lane V/C Ratio	0.445	-	-	-	0.216	-	-	0.004
HCM Control Delay (s)	24.4	0	-	-	9.1	0.8	-	10
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	2.2	0	-	-	0.8	-	-	0

3: Belle Haven & Bush Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	26	506	50	593	58	16	36	75	3	32
v/c Ratio	0.19	0.84	0.36	0.45	0.08	0.12	0.06	0.46	0.00	0.05
Control Delay	46.4	43.0	47.1	20.1	1.8	44.9	11.3	52.1	27.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	43.0	47.1	20.1	1.8	44.9	11.3	52.1	27.0	0.1
Queue Length 50th (ft)	16	292	33	116	1	10	0	46	1	0
Queue Length 95th (ft)	36	297	63	135	1	30	26	76	7	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	144	741	144	1460	747	137	565	181	751	705
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.68	0.35	0.41	0.08	0.12	0.06	0.41	0.00	0.05

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	20	377	12	40	474	46	14	1	31	57	2	24
Future Volume (veh/h)	20	377	12	40	474	46	14	1	31	57	2	24
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	26	490	16	50	592	58	16	1	35	75	3	32
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	71	546	18	104	1142	509	359	16	565	121	433	367
Arrive On Green	0.04	0.31	0.31	0.12	0.66	0.66	0.21	0.38	0.38	0.07	0.24	0.24
Sat Flow, veh/h	1725	1744	57	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	26	0	506	50	592	58	16	0	36	75	3	32
Grp Sat Flow(s),veh/h/ln	1725	0	1801	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	1.5	0.0	26.8	2.7	8.8	1.4	0.7	0.0	1.5	4.2	0.1	1.3
Cycle Q Clear(g_c), s	1.5	0.0	26.8	2.7	8.8	1.4	0.7	0.0	1.5	4.2	0.1	1.3
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	71	0	564	104	1142	509	359	0	581	121	433	367
V/C Ratio(X)	0.37	0.00	0.90	0.48	0.52	0.11	0.04	0.00	0.06	0.62	0.01	0.09
Avail Cap(c_a), veh/h	147	0	747	147	1428	637	359	0	581	181	433	367
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.91	0.91	0.91	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.7	0.0	32.8	42.5	12.7	11.5	31.7	0.0	19.9	45.2	29.0	20.3
Incr Delay (d2), s/veh	3.1	0.0	11.2	3.1	0.3	0.1	0.1	0.0	0.2	5.1	0.0	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	0.7	0.0	12.8	1.2	2.6	0.5	0.3	0.0	0.5	1.9	0.1	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.8	0.0	44.0	45.7	13.1	11.6	31.7	0.0	20.1	50.3	29.0	20.7
LnGrp LOS	D	A	D	D	B	B	C	A	C	D	C	C
Approach Vol, veh/h		532			700			52			110	
Approach Delay, s/veh		44.3			15.3			23.7			41.1	
Approach LOS		D			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	42.2	10.5	35.8	25.3	28.4	8.6	37.7
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	10.5	21.5	8.5	41.5	8.1	23.9	8.5	41.5
Max Q Clear Time (g_c+I1), s	6.2	3.5	4.7	28.8	2.7	3.3	3.5	10.8
Green Ext Time (p_c), s	0.0	0.1	0.0	2.4	0.0	0.1	0.0	4.5

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

4: SR 41 SB Ramp & Bush Street

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	373	187	117	520	120	96
v/c Ratio	0.64	0.31	0.52	0.47	0.14	0.12
Control Delay	15.9	4.7	18.5	13.7	9.1	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	4.7	18.5	13.7	9.1	3.2
Queue Length 50th (ft)	100	0	23	54	17	0
Queue Length 95th (ft)	134	30	47	71	49	21
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	778	753	304	1478	859	816
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.25	0.38	0.35	0.14	0.12

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	310	155	105	468	0	0	0	0	115	0	92
Future Volume (veh/h)	0	310	155	105	468	0	0	0	0	115	0	92
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	373	187	117	520	0				120	0	96
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	672	557	315	1276	0				786	0	700
Arrive On Green	0.00	0.37	0.37	0.37	0.37	0.00				0.45	0.00	0.45
Sat Flow, veh/h	0	1826	1513	829	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	373	187	117	520	0				120	0	96
Grp Sat Flow(s),veh/h/ln	0	1826	1513	829	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	8.1	4.5	6.5	5.6	0.0				2.0	0.0	1.8
Cycle Q Clear(g_c), s	0.0	8.1	4.5	14.6	5.6	0.0				2.0	0.0	1.8
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	672	557	315	1276	0				786	0	700
V/C Ratio(X)	0.00	0.56	0.34	0.37	0.41	0.00				0.15	0.00	0.14
Avail Cap(c_a), veh/h	0	785	651	366	1492	0				786	0	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.52	0.52	0.91	0.91	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.6	11.4	18.4	11.8	0.0				8.1	0.0	8.0
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.7	0.2	0.0				0.4	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	2.7	1.2	1.1	1.8	0.0				0.7	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.9	11.6	19.0	11.9	0.0				8.5	0.0	8.4
LnGrp LOS	A	B	B	B	B	A				A	A	A
Approach Vol, veh/h		560			637						216	
Approach Delay, s/veh		12.5			13.2						8.4	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				22.9		27.1		22.9				
Change Period (Y+Rc), s				4.5		4.5		4.5				
Max Green Setting (Gmax), s				21.5		19.5		21.5				
Max Q Clear Time (g_c+I1), s				10.1		4.0		16.6				
Green Ext Time (p_c), s				2.2		0.8		1.8				
Intersection Summary												
HCM 6th Ctrl Delay			12.2									
HCM 6th LOS			B									

	↗	→	←	↑	↱
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	78	410	483	268	258
v/c Ratio	0.29	0.69	0.41	0.31	0.29
Control Delay	11.5	17.3	10.6	10.3	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	17.3	10.6	10.3	2.7
Queue Length 50th (ft)	16	85	43	43	0
Queue Length 95th (ft)	25	94	60	103	34
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	351	785	1497	857	895
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.52	0.32	0.31	0.29

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	68	357	0	0	327	98	246	1	237	0	0	0
Future Volume (veh/h)	68	357	0	0	327	98	246	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	78	410	0	0	372	111	267	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	282	503	0	0	728	214	955	4	853			
Arrive On Green	0.55	0.55	0.00	0.00	0.27	0.27	0.55	0.55	0.55			
Sat Flow, veh/h	898	1841	0	0	2756	785	1747	7	1560			
Grp Volume(v), veh/h	78	410	0	0	243	240	268	0	258			
Grp Sat Flow(s),veh/h/ln	898	1841	0	0	1749	1699	1753	0	1560			
Q Serve(g_s), s	3.6	9.1	0.0	0.0	5.9	6.0	4.1	0.0	4.5			
Cycle Q Clear(g_c), s	9.6	9.1	0.0	0.0	5.9	6.0	4.1	0.0	4.5			
Prop In Lane	1.00		0.00	0.00		0.46	1.00		1.00			
Lane Grp Cap(c), veh/h	282	503	0	0	478	464	959	0	853			
V/C Ratio(X)	0.28	0.81	0.00	0.00	0.51	0.52	0.28	0.00	0.30			
Avail Cap(c_a), veh/h	423	792	0	0	752	731	959	0	853			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.72	0.72	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	12.9	10.3	0.0	0.0	15.3	15.4	6.1	0.0	6.2			
Incr Delay (d2), s/veh	0.4	2.7	0.0	0.0	0.8	0.9	0.7	0.0	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			
%ile BackOfQ(50%),veh/ln	0.5	2.4	0.0	0.0	2.1	2.1	1.3	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	13.0	0.0	0.0	16.2	16.3	6.8	0.0	7.1			
LnGrp LOS	B	B	A	A	B	B	A	A	A			
Approach Vol, veh/h		488			483			526				
Approach Delay, s/veh		13.0			16.2			6.9				
Approach LOS		B			B			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		31.8		18.2				18.2				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		19.5		21.5				21.5				
Max Q Clear Time (g_c+I1), s		6.5		11.6				8.0				
Green Ext Time (p_c), s		2.1		2.0				2.3				
Intersection Summary												
HCM 6th Ctrl Delay			11.9									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	218	251	125	18	202	16	93	57	19	16	42	130
Future Vol, veh/h	218	251	125	18	202	16	93	57	19	16	42	130
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	256	295	147	20	222	18	100	61	20	17	45	138
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	14.8	12.7	12.6	12.2
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	40%	0%	100%	81%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	60%	0%	0%	19%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	57	19	218	167	209	18	135	83	16	42	130
LT Vol	93	0	0	218	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	167	84	0	135	67	0	42	0
RT Vol	0	0	19	0	0	125	0	0	16	0	0	130
Lane Flow Rate	100	61	20	256	197	245	20	148	92	17	45	138
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.231	0.133	0.04	0.513	0.366	0.428	0.044	0.308	0.187	0.039	0.097	0.273
Departure Headway (Hd)	8.317	7.817	7.117	7.202	6.702	6.283	7.989	7.489	7.354	8.309	7.809	7.109
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	432	459	503	503	539	577	449	481	488	431	459	506
Service Time	6.061	5.561	4.861	4.902	4.402	3.983	5.728	5.228	5.094	6.051	5.551	4.851
HCM Lane V/C Ratio	0.231	0.133	0.04	0.509	0.365	0.425	0.045	0.308	0.189	0.039	0.098	0.273
HCM Control Delay	13.6	11.8	10.2	17.2	13.2	13.6	11.1	13.5	11.8	11.4	11.4	12.5
HCM Lane LOS	B	B	B	C	B	B	B	B	B	B	B	B
HCM 95th-tile Q	0.9	0.5	0.1	2.9	1.7	2.1	0.1	1.3	0.7	0.1	0.3	1.1

APPENDIX Z

MITIGATED

EXISTING (2018) PLUS APPROVED/PENDING/PROPOSED PROJECTS PLUS PROJECT PHASES 1, 2, & 3 CONDITIONS

ALTERNATIVE B

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

Intersection	
Intersection Delay, s/veh	11.3
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	81	984	593	31
Demand Flow Rate, veh/h	82	1004	604	31
Vehicles Circulating, veh/h	567	23	92	1019
Vehicles Exiting, veh/h	483	673	557	8
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.8	13.9	8.0	8.2
Approach LOS	A	B	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	82	1004	604	31
Cap Entry Lane, veh/h	774	1348	1256	488
Entry HV Adj Factor	0.984	0.980	0.982	0.999
Flow Entry, veh/h	81	984	593	31
Cap Entry, veh/h	761	1321	1233	487
V/C Ratio	0.106	0.745	0.481	0.064
Control Delay, s/veh	5.8	13.9	8.0	8.2
LOS	A	B	A	A
95th %tile Queue, veh	0	7	3	0

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	0	358	13	38	540	0	14	0	92	0	0	1
Future Vol, veh/h	0	358	13	38	540	0	14	0	92	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	53	53	53	58	58	58	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	675	25	66	931	0	25	0	167	0	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	931	0	0	700	0	0	1286	1751	688	1834	1763	466
Stage 1	-	-	-	-	-	-	688	688	-	1063	1063	-
Stage 2	-	-	-	-	-	-	598	1063	-	771	700	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	733	-	-	895	-	-	131	85	445	53	84	544
Stage 1	-	-	-	-	-	-	435	446	-	239	299	-
Stage 2	-	-	-	-	-	-	457	299	-	392	440	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	733	-	-	895	-	-	115	72	445	29	71	544
Mov Cap-2 Maneuver	-	-	-	-	-	-	115	72	-	29	71	-
Stage 1	-	-	-	-	-	-	435	446	-	239	253	-
Stage 2	-	-	-	-	-	-	386	253	-	245	440	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	31.4	11.6
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	323	733	-	-	895	-	-	544
HCM Lane V/C Ratio	0.597	-	-	-	0.073	-	-	0.003
HCM Control Delay (s)	31.4	0	-	-	9.3	0.6	-	11.6
HCM Lane LOS	D	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	3.6	0	-	-	0.2	-	-	0

3: Belle Haven & Bush Street

	↗	→	↙	←	↖	↖	↑	↘	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	51	798	33	862	74	14	68	78	66
v/c Ratio	0.36	0.97	0.24	0.58	0.10	0.10	0.11	0.48	0.09
Control Delay	51.3	52.6	36.1	14.5	0.4	44.5	0.3	53.3	0.2
Queue Delay	0.0	3.2	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	55.7	36.1	15.1	0.4	44.5	0.3	53.3	0.2
Queue Length 50th (ft)	31	483	21	105	0	8	0	48	0
Queue Length 95th (ft)	40	285	33	77	0	18	0	69	0
Internal Link Dist (ft)		493		306			135		
Turn Bay Length (ft)					50	50		75	75
Base Capacity (vph)	141	824	140	1555	743	140	632	178	773
Starvation Cap Reductn	0	0	0	323	0	0	0	0	0
Spillback Cap Reductn	0	15	0	0	0	0	2	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.99	0.24	0.70	0.10	0.10	0.11	0.44	0.09

Intersection Summary

3: Belle Haven & Bush Street

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	27	408	15	20	526	45	8	0	39	52	0	44
Future Volume (veh/h)	27	408	15	20	526	45	8	0	39	52	0	44
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	51	770	28	33	862	74	14	0	68	78	0	66
Peak Hour Factor	0.53	0.53	0.53	0.61	0.61	0.61	0.57	0.57	0.57	0.67	0.67	0.67
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	106	785	29	84	1512	659	200	0	298	238	392	332
Arrive On Green	0.06	0.44	0.44	0.10	0.86	0.86	0.11	0.00	0.19	0.14	0.00	0.21
Sat Flow, veh/h	1753	1765	64	1753	3497	1523	1753	0	1560	1753	1841	1560
Grp Volume(v), veh/h	51	0	798	33	862	74	14	0	68	78	0	66
Grp Sat Flow(s),veh/h/ln	1753	0	1829	1753	1749	1523	1753	0	1560	1753	1841	1560
Q Serve(g_s), s	2.8	0.0	43.0	1.8	6.6	0.4	0.7	0.0	3.7	4.0	0.0	2.8
Cycle Q Clear(g_c), s	2.8	0.0	43.0	1.8	6.6	0.4	0.7	0.0	3.7	4.0	0.0	2.8
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	106	0	814	84	1512	659	200	0	298	238	392	332
V/C Ratio(X)	0.48	0.00	0.98	0.39	0.57	0.11	0.07	0.00	0.23	0.33	0.00	0.20
Avail Cap(c_a), veh/h	142	0	814	142	1556	678	200	0	298	238	392	332
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.97	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.4	0.0	27.3	43.8	4.3	1.4	39.6	0.0	34.2	39.1	0.0	21.1
Incr Delay (d2), s/veh	3.3	0.0	26.6	2.9	0.5	0.1	0.1	0.0	1.8	0.8	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	23.1	0.8	1.5	0.2	0.3	0.0	1.5	1.7	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	54.0	46.7	4.7	1.5	39.7	0.0	36.0	39.9	0.0	22.5
LnGrp LOS	D	A	D	D	A	A	D	A	D	D	A	C
Approach Vol, veh/h		849			969			82			144	
Approach Delay, s/veh		53.7			5.9			36.6			31.9	
Approach LOS		D			A			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.1	23.6	9.3	49.0	15.9	25.8	10.6	47.7
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	10.3	19.1	8.1	44.5	8.1	21.3	8.1	44.5
Max Q Clear Time (g_c+I1), s	6.0	5.7	3.8	45.0	2.7	4.8	4.8	8.6
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.1	0.0	7.3

Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

4: SR 41 SB Ramp & Bush Street

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	553	307	353	606	80	135
v/c Ratio	0.86	0.41	0.83	0.27	0.17	0.27
Control Delay	16.0	1.5	49.5	3.3	33.7	7.8
Queue Delay	4.1	0.5	0.0	0.0	0.0	0.0
Total Delay	20.1	2.1	49.5	3.3	33.7	7.8
Queue Length 50th (ft)	133	0	200	18	41	0
Queue Length 95th (ft)	69	0	283	51	70	27
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	721	799	494	2516	462	508
Starvation Cap Reductn	103	204	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.52	0.71	0.24	0.17	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	321	178	286	491	0	0	0	0	59	0	100
Future Volume (veh/h)	0	321	178	286	491	0	0	0	0	59	0	100
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	553	307	353	606	0				80	0	135
Peak Hour Factor	0.58	0.58	0.58	0.81	0.81	0.81				0.74	0.74	0.74
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	619	525	390	2112	0				537	0	477
Arrive On Green	0.00	0.34	0.34	0.22	0.60	0.00				0.31	0.00	0.31
Sat Flow, veh/h	0	1841	1560	1753	3589	0				1753	0	1558
Grp Volume(v), veh/h	0	553	307	353	606	0				80	0	135
Grp Sat Flow(s),veh/h/ln	0	1841	1560	1753	1749	0				1753	0	1558
Q Serve(g_s), s	0.0	28.5	16.3	19.6	8.3	0.0				3.3	0.0	6.6
Cycle Q Clear(g_c), s	0.0	28.5	16.3	19.6	8.3	0.0				3.3	0.0	6.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	619	525	390	2112	0				537	0	477
V/C Ratio(X)	0.00	0.89	0.58	0.91	0.29	0.00				0.15	0.00	0.28
Avail Cap(c_a), veh/h	0	727	616	500	2536	0				537	0	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.26	0.26	0.52	0.52	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	31.5	27.4	37.9	9.5	0.0				25.2	0.0	26.4
Incr Delay (d2), s/veh	0.0	3.7	0.3	10.0	0.0	0.0				0.6	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.7	5.9	9.3	2.9	0.0				1.5	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	35.1	27.7	47.9	9.5	0.0				25.8	0.0	27.8
LnGrp LOS	A	D	C	D	A	A				C	A	C
Approach Vol, veh/h		860			959						215	
Approach Delay, s/veh		32.5			23.6						27.1	
Approach LOS		C			C						C	

Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			26.7	38.1		35.1		64.9				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			28.5	39.5		18.5		72.5				
Max Q Clear Time (g_c+I1), s			21.6	30.5		8.6		10.3				
Green Ext Time (p_c), s			0.6	3.1		0.6		4.6				

Intersection Summary			
HCM 6th Ctrl Delay			27.7
HCM 6th LOS			C

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 Roundabout AM
5: SR 41 NB Ramp & Bush Street

08/24/2019

	↗	→	←	↑	↱
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	121	502	915	253	111
v/c Ratio	0.58	0.54	0.79	0.35	0.16
Control Delay	26.3	4.9	33.5	24.6	5.5
Queue Delay	0.0	0.1	0.0	0.0	0.0
Total Delay	26.3	5.0	33.5	24.6	5.5
Queue Length 50th (ft)	65	69	262	110	0
Queue Length 95th (ft)	69	0	263	162	22
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	271	1116	1391	718	706
Starvation Cap Reductn	0	85	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.49	0.66	0.35	0.16

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 Roundabout AM
5: SR 41 NB Ramp & Bush Street

08/24/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	74	306	0	0	592	158	185	2	82	0	0	0
Future Volume (veh/h)	74	306	0	0	592	158	185	2	82	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	121	502	0	0	722	193	250	3	111			
Peak Hour Factor	0.61	0.61	0.61	0.82	0.82	0.82	0.74	0.74	0.74			
Percent Heavy Veh, %	3	3	0	0	3	3	3	3	3			
Cap, veh/h	149	825	0	0	862	231	813	10	732			
Arrive On Green	0.17	0.89	0.00	0.00	0.32	0.32	0.47	0.47	0.47			
Sat Flow, veh/h	1767	1856	0	0	2829	731	1747	21	1572			
Grp Volume(v), veh/h	121	502	0	0	465	450	253	0	111			
Grp Sat Flow(s),veh/h/ln	1767	1856	0	0	1763	1705	1768	0	1572			
Q Serve(g_s), s	6.6	6.5	0.0	0.0	24.5	24.5	8.9	0.0	4.1			
Cycle Q Clear(g_c), s	6.6	6.5	0.0	0.0	24.5	24.5	8.9	0.0	4.1			
Prop In Lane	1.00		0.00	0.00		0.43	0.99		1.00			
Lane Grp Cap(c), veh/h	149	825	0	0	556	537	823	0	732			
V/C Ratio(X)	0.81	0.61	0.00	0.00	0.84	0.84	0.31	0.00	0.15			
Avail Cap(c_a), veh/h	274	1123	0	0	714	691	823	0	732			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.40	0.40	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	40.8	3.4	0.0	0.0	31.9	31.9	16.7	0.0	15.4			
Incr Delay (d2), s/veh	4.3	0.3	0.0	0.0	6.9	7.1	1.0	0.0	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			
%ile BackOfQ(50%),veh/ln	2.8	1.4	0.0	0.0	11.1	10.8	3.7	0.0	1.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	3.7	0.0	0.0	38.7	39.0	17.6	0.0	15.8			
LnGrp LOS	D	A	A	A	D	D	B	A	B			
Approach Vol, veh/h		623			915			364				
Approach Delay, s/veh		11.8			38.9			17.1				
Approach LOS		B			D			B				
Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		51.0		49.0			12.9	36.0				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		30.5		60.5			15.5	40.5				
Max Q Clear Time (g_c+I1), s		10.9		8.5			8.6	26.5				
Green Ext Time (p_c), s		1.8		3.5			0.1	5.0				
Intersection Summary												
HCM 6th Ctrl Delay			25.8									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	31.3
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	106	198	84	22	253	22	194	53	19	32	59	303
Future Vol, veh/h	106	198	84	22	253	22	194	53	19	32	59	303
Peak Hour Factor	0.54	0.54	0.54	0.86	0.86	0.86	0.70	0.70	0.70	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	196	367	156	26	294	26	277	76	27	36	67	344
Number of Lanes	1	2	0	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	26.4	21.6	36.8	42
HCM LOS	D	C	E	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	44%	0%	100%	79%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	56%	0%	0%	21%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	194	53	19	106	132	150	22	169	106	32	59	303
LT Vol	194	0	0	106	0	0	22	0	0	32	0	0
Through Vol	0	53	0	0	132	66	0	169	84	0	59	0
RT Vol	0	0	19	0	0	84	0	0	22	0	0	303
Lane Flow Rate	277	76	27	196	244	278	26	196	124	36	67	344
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.804	0.209	0.07	0.531	0.627	0.682	0.076	0.552	0.343	0.104	0.183	0.874
Departure Headway (Hd)	10.447	9.947	9.247	9.732	9.232	8.84	10.638	10.138	9.993	10.342	9.842	9.142
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	346	360	386	369	391	408	336	355	359	346	363	396
Service Time	8.239	7.739	7.039	7.513	7.013	6.621	8.432	7.932	7.787	8.132	7.632	6.932
HCM Lane V/C Ratio	0.801	0.211	0.07	0.531	0.624	0.681	0.077	0.552	0.345	0.104	0.185	0.869
HCM Control Delay	45	15.4	12.7	23.1	26.4	28.7	14.3	24.8	18	14.3	14.8	50.2
HCM Lane LOS	E	C	B	C	D	D	B	C	C	B	B	F
HCM 95th-tile Q	6.8	0.8	0.2	3	4.1	4.9	0.2	3.2	1.5	0.3	0.7	8.6

Intersection	
Intersection Delay, s/veh	6.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	231	528	231	18
Demand Flow Rate, veh/h	235	538	235	18
Vehicles Circulating, veh/h	288	19	236	535
Vehicles Exiting, veh/h	265	452	287	22
Ped Vol Crossing Leg, #/h	2	2	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.8	6.5	5.4	4.7
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	235	538	235	18
Cap Entry Lane, veh/h	1029	1353	1085	800
Entry HV Adj Factor	0.982	0.982	0.983	0.999
Flow Entry, veh/h	231	528	231	18
Cap Entry, veh/h	1010	1328	1066	799
V/C Ratio	0.229	0.398	0.217	0.023
Control Delay, s/veh	5.8	6.5	5.4	4.7
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	0

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰↑↑↱			✥			✥	
Traffic Vol, veh/h	0	328	10	157	355	0	23	0	81	0	0	2
Future Vol, veh/h	0	328	10	157	355	0	23	0	81	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	426	13	242	546	0	32	0	114	0	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	546	0	0	439	0	0	1190	1463	433	1520	1469	273
Stage 1	-	-	-	-	-	-	433	433	-	1030	1030	-
Stage 2	-	-	-	-	-	-	757	1030	-	490	439	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1021	-	-	1119	-	-	153	128	622	89	127	725
Stage 1	-	-	-	-	-	-	600	581	-	251	310	-
Stage 2	-	-	-	-	-	-	367	310	-	559	577	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1021	-	-	1119	-	-	116	88	622	55	88	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	88	-	55	88	-
Stage 1	-	-	-	-	-	-	600	581	-	251	214	-
Stage 2	-	-	-	-	-	-	252	214	-	456	577	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.3	25.7	10
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	317	1021	-	-	1119	-	-	725
HCM Lane V/C Ratio	0.462	-	-	-	0.216	-	-	0.004
HCM Control Delay (s)	25.7	0	-	-	9.1	0.7	-	10
HCM Lane LOS	D	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	2.3	0	-	-	0.8	-	-	0

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 Roundabout PM
3: Belle Haven & Bush Street

08/24/2019

	↗	→	↙	←	↖	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	26	506	50	593	58	16	36	75	3	32
v/c Ratio	0.19	0.84	0.36	0.45	0.08	0.12	0.06	0.46	0.00	0.05
Control Delay	46.4	43.0	47.1	20.1	1.8	44.9	11.3	52.1	27.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	43.0	47.1	20.1	1.8	44.9	11.3	52.1	27.0	0.1
Queue Length 50th (ft)	16	292	33	116	1	10	0	46	1	0
Queue Length 95th (ft)	36	297	63	135	1	30	26	76	7	0
Internal Link Dist (ft)		493		306			135		111	
Turn Bay Length (ft)					50	50		75		75
Base Capacity (vph)	144	741	144	1460	747	137	565	181	751	705
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.68	0.35	0.41	0.08	0.12	0.06	0.41	0.00	0.05

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	20	377	12	40	474	46	14	1	31	57	2	24
Future Volume (veh/h)	20	377	12	40	474	46	14	1	31	57	2	24
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	26	490	16	50	592	58	16	1	35	75	3	32
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.89	0.89	0.89	0.76	0.76	0.76
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	71	546	18	104	1142	509	359	16	565	121	433	367
Arrive On Green	0.04	0.31	0.31	0.12	0.66	0.66	0.21	0.38	0.38	0.07	0.24	0.24
Sat Flow, veh/h	1725	1744	57	1725	3441	1535	1725	43	1499	1725	1811	1535
Grp Volume(v), veh/h	26	0	506	50	592	58	16	0	36	75	3	32
Grp Sat Flow(s),veh/h/ln	1725	0	1801	1725	1721	1535	1725	0	1541	1725	1811	1535
Q Serve(g_s), s	1.5	0.0	26.8	2.7	8.8	1.4	0.7	0.0	1.5	4.2	0.1	1.3
Cycle Q Clear(g_c), s	1.5	0.0	26.8	2.7	8.8	1.4	0.7	0.0	1.5	4.2	0.1	1.3
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.97	1.00		1.00
Lane Grp Cap(c), veh/h	71	0	564	104	1142	509	359	0	581	121	433	367
V/C Ratio(X)	0.37	0.00	0.90	0.48	0.52	0.11	0.04	0.00	0.06	0.62	0.01	0.09
Avail Cap(c_a), veh/h	147	0	747	147	1428	637	359	0	581	181	433	367
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.91	0.91	0.91	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.7	0.0	32.8	42.5	12.7	11.5	31.7	0.0	19.9	45.2	29.0	20.3
Incr Delay (d2), s/veh	3.1	0.0	11.2	3.1	0.3	0.1	0.1	0.0	0.2	5.1	0.0	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	0.7	0.0	12.8	1.2	2.6	0.5	0.3	0.0	0.5	1.9	0.1	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.8	0.0	44.0	45.7	13.1	11.6	31.7	0.0	20.1	50.3	29.0	20.7
LnGrp LOS	D	A	D	D	B	B	C	A	C	D	C	C
Approach Vol, veh/h		532			700			52			110	
Approach Delay, s/veh		44.3			15.3			23.7			41.1	
Approach LOS		D			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	42.2	10.5	35.8	25.3	28.4	8.6	37.7
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	10.5	21.5	8.5	41.5	8.1	23.9	8.5	41.5
Max Q Clear Time (g_c+I1), s	6.2	3.5	4.7	28.8	2.7	3.3	3.5	10.8
Green Ext Time (p_c), s	0.0	0.1	0.0	2.4	0.0	0.1	0.0	4.5

Intersection Summary			
HCM 6th Ctrl Delay			28.7
HCM 6th LOS			C

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	373	187	117	520	120	96
v/c Ratio	0.64	0.31	0.52	0.47	0.14	0.12
Control Delay	15.9	4.7	18.5	13.7	9.1	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	4.7	18.5	13.7	9.1	3.2
Queue Length 50th (ft)	100	0	23	54	17	0
Queue Length 95th (ft)	134	30	47	71	49	21
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)			249			466
Base Capacity (vph)	778	753	304	1478	859	816
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.25	0.38	0.35	0.14	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑↑						↰	↱
Traffic Volume (veh/h)	0	310	155	105	468	0	0	0	0	115	0	92
Future Volume (veh/h)	0	310	155	105	468	0	0	0	0	115	0	92
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	373	187	117	520	0				120	0	96
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90				0.96	0.96	0.96
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	672	557	315	1276	0				786	0	700
Arrive On Green	0.00	0.37	0.37	0.37	0.37	0.00				0.45	0.00	0.45
Sat Flow, veh/h	0	1826	1513	829	3561	0				1739	0	1547
Grp Volume(v), veh/h	0	373	187	117	520	0				120	0	96
Grp Sat Flow(s),veh/h/ln	0	1826	1513	829	1735	0				1739	0	1547
Q Serve(g_s), s	0.0	8.1	4.5	6.5	5.6	0.0				2.0	0.0	1.8
Cycle Q Clear(g_c), s	0.0	8.1	4.5	14.6	5.6	0.0				2.0	0.0	1.8
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	672	557	315	1276	0				786	0	700
V/C Ratio(X)	0.00	0.56	0.34	0.37	0.41	0.00				0.15	0.00	0.14
Avail Cap(c_a), veh/h	0	785	651	366	1492	0				786	0	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.52	0.52	0.91	0.91	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.6	11.4	18.4	11.8	0.0				8.1	0.0	8.0
Incr Delay (d2), s/veh	0.0	0.4	0.2	0.7	0.2	0.0				0.4	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	2.7	1.2	1.1	1.8	0.0				0.7	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.9	11.6	19.0	11.9	0.0				8.5	0.0	8.4
LnGrp LOS	A	B	B	B	B	A				A	A	A
Approach Vol, veh/h		560			637						216	
Approach Delay, s/veh		12.5			13.2						8.4	
Approach LOS		B			B						A	

Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				22.9		27.1		22.9				
Change Period (Y+Rc), s				4.5		4.5		4.5				
Max Green Setting (Gmax), s				21.5		19.5		21.5				
Max Q Clear Time (g_c+I1), s				10.1		4.0		16.6				
Green Ext Time (p_c), s				2.2		0.8		1.8				

Intersection Summary			
HCM 6th Ctrl Delay			12.2
HCM 6th LOS			B

5: SR 41 NB Ramp & Bush Street

	↗	→	←	↑	↱
Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	78	410	483	268	258
v/c Ratio	0.29	0.69	0.41	0.31	0.29
Control Delay	11.5	17.3	10.6	10.3	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	17.3	10.6	10.3	2.7
Queue Length 50th (ft)	16	85	43	43	0
Queue Length 95th (ft)	25	94	60	103	34
Internal Link Dist (ft)		456	98	103	
Turn Bay Length (ft)	114				300
Base Capacity (vph)	351	785	1497	857	895
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.52	0.32	0.31	0.29

Intersection Summary

Mitigated Existing + Approved/Pending/Proposed + Project Phase 3 Roundabout PM
5: SR 41 NB Ramp & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↑↱			↰	↱			
Traffic Volume (veh/h)	68	357	0	0	327	98	246	1	237	0	0	0
Future Volume (veh/h)	68	357	0	0	327	98	246	1	237	0	0	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	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	78	410	0	0	372	111	267	1	258			
Peak Hour Factor	0.87	0.87	0.87	0.88	0.88	0.88	0.92	0.92	0.92			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	282	503	0	0	728	214	955	4	853			
Arrive On Green	0.55	0.55	0.00	0.00	0.27	0.27	0.55	0.55	0.55			
Sat Flow, veh/h	898	1841	0	0	2756	785	1747	7	1560			
Grp Volume(v), veh/h	78	410	0	0	243	240	268	0	258			
Grp Sat Flow(s),veh/h/ln	898	1841	0	0	1749	1699	1753	0	1560			
Q Serve(g_s), s	3.6	9.1	0.0	0.0	5.9	6.0	4.1	0.0	4.5			
Cycle Q Clear(g_c), s	9.6	9.1	0.0	0.0	5.9	6.0	4.1	0.0	4.5			
Prop In Lane	1.00		0.00	0.00		0.46	1.00		1.00			
Lane Grp Cap(c), veh/h	282	503	0	0	478	464	959	0	853			
V/C Ratio(X)	0.28	0.81	0.00	0.00	0.51	0.52	0.28	0.00	0.30			
Avail Cap(c_a), veh/h	423	792	0	0	752	731	959	0	853			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.72	0.72	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	12.9	10.3	0.0	0.0	15.3	15.4	6.1	0.0	6.2			
Incr Delay (d2), s/veh	0.4	2.7	0.0	0.0	0.8	0.9	0.7	0.0	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			
%ile BackOfQ(50%),veh/ln	0.5	2.4	0.0	0.0	2.1	2.1	1.3	0.0	1.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	13.0	0.0	0.0	16.2	16.3	6.8	0.0	7.1			
LnGrp LOS	B	B	A	A	B	B	A	A	A			
Approach Vol, veh/h		488			483			526				
Approach Delay, s/veh		13.0			16.2			6.9				
Approach LOS		B			B			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		31.8		18.2				18.2				
Change Period (Y+Rc), s		4.5		4.5				4.5				
Max Green Setting (Gmax), s		19.5		21.5				21.5				
Max Q Clear Time (g_c+I1), s		6.5		11.6				8.0				
Green Ext Time (p_c), s		2.1		2.0				2.3				
Intersection Summary												
HCM 6th Ctrl Delay			11.9									
HCM 6th LOS			B									

Intersection	
Intersection Delay, s/veh	14.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	218	251	125	18	202	16	93	57	19	16	42	130
Future Vol, veh/h	218	251	125	18	202	16	93	57	19	16	42	130
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.93	0.93	0.93	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	256	295	147	20	222	18	100	61	20	17	45	138
Number of Lanes	1	1	1	1	2	0	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	15.9	12.8	12.6	12.2
HCM LOS	C	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	81%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	19%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	57	19	218	251	125	18	135	83	16	42	130
LT Vol	93	0	0	218	0	0	18	0	0	16	0	0
Through Vol	0	57	0	0	251	0	0	135	67	0	42	0
RT Vol	0	0	19	0	0	125	0	0	16	0	0	130
Lane Flow Rate	100	61	20	256	295	147	20	148	92	17	45	138
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.231	0.133	0.04	0.513	0.55	0.245	0.044	0.308	0.187	0.039	0.097	0.273
Departure Headway (Hd)	8.328	7.828	7.128	7.202	6.702	6.002	7.997	7.497	7.362	8.318	7.818	7.118
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	432	458	502	503	540	601	448	479	488	431	458	505
Service Time	6.072	5.572	4.872	4.902	4.402	3.702	5.736	5.236	5.101	6.062	5.562	4.862
HCM Lane V/C Ratio	0.231	0.133	0.04	0.509	0.546	0.245	0.045	0.309	0.189	0.039	0.098	0.273
HCM Control Delay	13.6	11.8	10.2	17.2	17.3	10.6	11.1	13.6	11.8	11.4	11.4	12.5
HCM Lane LOS	B	B	B	C	C	B	B	B	B	B	B	B
HCM 95th-tile Q	0.9	0.5	0.1	2.9	3.3	1	0.1	1.3	0.7	0.1	0.3	1.1

APPENDIX AA

2035 PROJECT CONDITIONS

SIGNAL ALTERNATIVE

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

	↗	→	↙	←	↖	↗	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	2	81	416	300	16	283	20	6
v/c Ratio	0.01	0.13	0.64	0.24	0.06	0.24	0.08	0.01
Control Delay	28.0	20.2	31.6	15.5	29.0	0.5	29.1	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	20.2	31.6	15.5	29.0	0.5	29.1	12.0
Queue Length 50th (ft)	1	11	67	32	5	0	6	0
Queue Length 95th (ft)	7	31	#204	99	27	0	31	9
Internal Link Dist (ft)		328		768				326
Turn Bay Length (ft)			394					
Base Capacity (vph)	259	1467	650	1657	248	1180	248	694
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.06	0.64	0.18	0.06	0.24	0.08	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	2	65	9	383	267	9	15	0	260	18	1	5
Future Volume (veh/h)	2	65	9	383	267	9	15	0	260	18	1	5
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	71	10	416	290	10	16	0	283	20	1	5
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	262	404	56	527	471	16	67	730	619	67	106	529
Arrive On Green	0.15	0.13	0.13	0.15	0.13	0.13	0.04	0.00	0.39	0.04	0.39	0.39
Sat Flow, veh/h	1781	3136	433	3456	3505	121	1781	1870	1585	1781	271	1355
Grp Volume(v), veh/h	2	40	41	416	147	153	16	0	283	20	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1792	1728	1777	1849	1781	1870	1585	1781	0	1626
Q Serve(g_s), s	0.1	1.2	1.3	7.2	4.8	4.9	0.5	0.0	4.2	0.7	0.0	0.1
Cycle Q Clear(g_c), s	0.1	1.2	1.3	7.2	4.8	4.9	0.5	0.0	4.2	0.7	0.0	0.1
Prop In Lane	1.00		0.24	1.00		0.07	1.00		1.00	1.00		0.83
Lane Grp Cap(c), veh/h	262	229	231	527	239	248	67	730	619	67	0	635
V/C Ratio(X)	0.01	0.17	0.18	0.79	0.61	0.62	0.24	0.00	0.46	0.30	0.00	0.01
Avail Cap(c_a), veh/h	262	688	694	602	768	799	230	730	619	230	0	635
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	0.00	1.00
Uniform Delay (d), s/veh	22.6	24.0	24.1	25.3	25.3	25.3	29.0	0.0	3.7	29.0	0.0	11.6
Incr Delay (d2), s/veh	0.0	0.4	0.4	6.2	2.6	2.5	1.8	0.0	2.4	2.5	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	0.0	0.5	0.5	3.1	2.0	2.1	0.3	0.0	2.6	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	24.4	24.4	31.5	27.9	27.8	30.8	0.0	6.1	31.5	0.0	11.6
LnGrp LOS	C	C	C	C	C	C	C	A	A	C	A	B
Approach Vol, veh/h		83			716			299			26	
Approach Delay, s/veh		24.4			30.0			7.4			26.9	
Approach LOS		C			C			A			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	28.7	14.0	12.5	6.8	28.7	13.6	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	8.0	24.2	10.8	24.0	8.0	24.2	8.0	26.8
Max Q Clear Time (g_c+I1), s	2.7	6.2	9.2	3.3	2.5	2.1	2.1	6.9
Green Ext Time (p_c), s	0.0	0.9	0.3	0.3	0.0	0.0	0.0	1.5

Intersection Summary			
HCM 6th Ctrl Delay			23.5
HCM 6th LOS			C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	2	425	41	684	5	15	100	3	7
v/c Ratio	0.01	0.42	0.16	0.59	0.01	0.06	0.10	0.01	0.01
Control Delay	29.5	18.7	29.8	19.2	0.0	29.8	0.2	30.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	18.7	29.8	19.2	0.0	29.8	0.2	30.3	0.0
Queue Length 50th (ft)	1	47	10	83	0	4	0	1	0
Queue Length 95th (ft)	8	129	54	224	0	27	0	10	0
Internal Link Dist (ft)		1		563					175
Turn Bay Length (ft)									
Base Capacity (vph)	271	2101	264	2110	995	264	1009	264	937
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.20	0.16	0.32	0.01	0.06	0.10	0.01	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	2	378	13	38	629	5	14	0	92	3	0	6
Future Volume (veh/h)	2	378	13	38	629	5	14	0	92	3	0	6
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	411	14	41	684	5	15	0	100	3	0	7
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	8	753	26	117	981	437	52	738	625	52	0	625
Arrive On Green	0.00	0.21	0.21	0.07	0.28	0.28	0.03	0.00	0.39	0.03	0.00	0.39
Sat Flow, veh/h	1781	3507	119	1781	3554	1585	1781	1870	1585	1781	0	1585
Grp Volume(v), veh/h	2	208	217	41	684	5	15	0	100	3	0	7
Grp Sat Flow(s),veh/h/ln	1781	1777	1849	1781	1777	1585	1781	1870	1585	1781	0	1585
Q Serve(g_s), s	0.1	6.3	6.4	1.3	10.5	0.1	0.5	0.0	1.6	0.1	0.0	0.2
Cycle Q Clear(g_c), s	0.1	6.3	6.4	1.3	10.5	0.1	0.5	0.0	1.6	0.1	0.0	0.2
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	8	381	397	117	981	437	52	738	625	52	0	625
V/C Ratio(X)	0.26	0.55	0.55	0.35	0.70	0.01	0.29	0.00	0.16	0.06	0.00	0.01
Avail Cap(c_a), veh/h	234	934	972	234	1869	834	234	738	625	234	0	625
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	0.00	1.00
Uniform Delay (d), s/veh	30.2	21.3	21.3	27.2	19.8	16.0	28.9	0.0	5.0	28.7	0.0	11.2
Incr Delay (d2), s/veh	16.5	1.2	1.2	1.8	0.9	0.0	2.9	0.0	0.5	0.4	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	0.1	2.5	2.6	0.6	3.9	0.0	0.2	0.0	0.8	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.7	22.5	22.4	29.0	20.7	16.0	31.8	0.0	5.5	29.2	0.0	11.2
LnGrp LOS	D	C	C	C	C	B	C	A	A	C	A	B
Approach Vol, veh/h		427			730			115			10	
Approach Delay, s/veh		22.6			21.1			9.0			16.6	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.3	28.5	8.5	17.6	6.3	28.5	4.8	21.3
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	8.0	24.0	8.0	32.0	8.0	24.0	8.0	32.0
Max Q Clear Time (g_c+I1), s	2.1	3.6	3.3	8.4	2.5	2.2	2.1	12.5
Green Ext Time (p_c), s	0.0	0.3	0.0	2.3	0.0	0.0	0.0	4.3

Intersection Summary			
HCM 6th Ctrl Delay			20.5
HCM 6th LOS			C

2035 Project AM Signals
3: Belle Haven & Bush Street

08/24/2019

	↗	→	↙	←	↖	↗	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	32	498	28	786	14	75	85	49
v/c Ratio	0.17	0.34	0.13	0.50	0.07	0.08	0.40	0.03
Control Delay	42.2	25.8	38.3	24.9	41.9	0.2	44.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	25.8	38.3	24.9	41.9	0.2	44.0	0.0
Queue Length 50th (ft)	13	51	11	83	6	0	35	0
Queue Length 95th (ft)	54	92	47	134	30	0	111	0
Internal Link Dist (ft)		493		306				111
Turn Bay Length (ft)					50	50	75	
Base Capacity (vph)	188	3558	223	3530	188	884	247	1787
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.14	0.13	0.22	0.07	0.08	0.34	0.03

Intersection Summary

2035 Project AM Signals
3: Belle Haven & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑↱		↰	↑↑↑↱		↰	↑↑	↱	↰	↑↱	
Traffic Volume (veh/h)	29	435	23	26	640	83	13	0	69	78	0	45
Future Volume (veh/h)	29	435	23	26	640	83	13	0	69	78	0	45
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	32	473	25	28	696	90	14	0	75	85	0	49
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, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	90	874	46	217	1220	154	47	1442	643	153	827	737
Arrive On Green	0.05	0.14	0.14	0.12	0.21	0.21	0.03	0.00	0.41	0.09	0.00	0.47
Sat Flow, veh/h	1753	6208	324	1753	5723	723	1753	3497	1560	1753	1749	1560
Grp Volume(v), veh/h	32	360	138	28	575	211	14	0	75	85	0	49
Grp Sat Flow(s),veh/h/ln	1753	1583	1782	1753	1583	1697	1753	1749	1560	1753	1749	1560
Q Serve(g_s), s	1.3	5.4	5.5	1.1	8.3	8.6	0.6	0.0	2.3	3.6	0.0	1.3
Cycle Q Clear(g_c), s	1.3	5.4	5.5	1.1	8.3	8.6	0.6	0.0	2.3	3.6	0.0	1.3
Prop In Lane	1.00		0.18	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	669	251	217	1013	362	47	1442	643	153	827	737
V/C Ratio(X)	0.35	0.54	0.55	0.13	0.57	0.58	0.30	0.00	0.12	0.55	0.00	0.07
Avail Cap(c_a), veh/h	184	2610	980	217	2610	932	184	1442	643	241	827	737
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	0.00	1.00
Uniform Delay (d), s/veh	35.0	30.5	30.6	29.8	26.9	27.0	36.5	0.0	13.9	33.4	0.0	11.0
Incr Delay (d2), s/veh	2.3	0.7	1.9	0.3	0.5	1.5	3.4	0.0	0.4	3.1	0.0	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	0.6	2.0	2.3	0.5	3.0	3.4	0.3	0.0	0.8	1.6	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.3	31.2	32.4	30.1	27.4	28.5	39.9	0.0	14.2	36.5	0.0	11.1
LnGrp LOS	D	C	C	C	C	C	D	A	B	D	A	B
Approach Vol, veh/h		530			814			89			134	
Approach Delay, s/veh		31.9			27.8			18.3			27.3	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	36.0	14.0	15.3	6.6	40.6	8.4	20.8
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	10.5	31.5	8.0	42.0	8.0	34.0	8.0	42.0
Max Q Clear Time (g_c+I1), s	5.6	4.3	3.1	7.5	2.6	3.3	3.3	10.6
Green Ext Time (p_c), s	0.1	0.2	0.0	3.3	0.0	0.2	0.0	5.7

Intersection Summary	
HCM 6th Ctrl Delay	28.6
HCM 6th LOS	C

4: SR 41 SB Ramp & Bush Street

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	403	218	313	684	64	132
v/c Ratio	0.41	0.46	0.78	0.28	0.09	0.19
Control Delay	28.2	6.4	30.5	4.4	19.8	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	6.4	30.5	4.4	19.8	5.5
Queue Length 50th (ft)	68	0	49	30	19	0
Queue Length 95th (ft)	69	41	#295	13	58	42
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)		50	249			466
Base Capacity (vph)	1932	735	416	3304	701	698
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.30	0.75	0.21	0.09	0.19

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑						↰	↱
Traffic Volume (veh/h)	0	371	201	288	629	0	0	0	0	59	0	121
Future Volume (veh/h)	0	371	201	288	629	0	0	0	0	59	0	121
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	403	218	313	684	0				64	0	132
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	984	305	352	2275	0				762	0	678
Arrive On Green	0.00	0.20	0.20	0.20	0.45	0.00				0.43	0.00	0.43
Sat Flow, veh/h	0	5191	1560	1753	5191	0				1753	0	1559
Grp Volume(v), veh/h	0	403	218	313	684	0				64	0	132
Grp Sat Flow(s),veh/h/ln	0	1675	1560	1753	1675	0				1753	0	1559
Q Serve(g_s), s	0.0	5.6	10.5	13.9	6.9	0.0				1.7	0.0	4.2
Cycle Q Clear(g_c), s	0.0	5.6	10.5	13.9	6.9	0.0				1.7	0.0	4.2
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	984	305	352	2275	0				762	0	678
V/C Ratio(X)	0.00	0.41	0.71	0.89	0.30	0.00				0.08	0.00	0.19
Avail Cap(c_a), veh/h	0	1947	604	383	3329	0				762	0	678
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.96	0.96	0.81	0.81	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	28.1	30.1	31.1	13.9	0.0				13.3	0.0	14.0
Incr Delay (d2), s/veh	0.0	0.3	3.0	17.6	0.1	0.0				0.2	0.0	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	0.0	2.2	4.0	7.3	2.4	0.0				0.7	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	28.4	33.1	48.7	13.9	0.0				13.5	0.0	14.6
LnGrp LOS	A	C	C	D	B	A				B	A	B
Approach Vol, veh/h		621			997						196	
Approach Delay, s/veh		30.0			24.8						14.2	
Approach LOS		C			C						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			20.6	20.2		39.3		40.7				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			17.5	31.0		18.0		53.0				
Max Q Clear Time (g_c+I1), s			15.9	12.5		6.2		8.9				
Green Ext Time (p_c), s			0.2	3.2		0.6		5.3				
Intersection Summary												
HCM 6th Ctrl Delay			25.5									
HCM 6th LOS			C									

	↗	→	←	↖	↑	↱
Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	91	376	725	172	274	98
v/c Ratio	0.44	0.19	0.56	0.33	0.32	0.12
Control Delay	35.1	3.6	26.7	5.0	17.3	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	3.6	26.7	5.0	17.3	4.8
Queue Length 50th (ft)	51	10	117	0	82	0
Queue Length 95th (ft)	98	14	123	36	185	32
Internal Link Dist (ft)		456	98		103	
Turn Bay Length (ft)	114					300
Base Capacity (vph)	233	2927	1982	708	853	811
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.13	0.37	0.24	0.32	0.12

Intersection Summary

5: SR 41 NB Ramp & Bush Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑			↑↑↑	↱		↰↑	↱			
Traffic Volume (veh/h)	84	346	0	0	667	158	250	2	90	0	0	0
Future Volume (veh/h)	84	346	0	0	667	158	250	2	90	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	91	376	0	0	725	172	272	2	98			
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	0	0	3	3	3	3	3			
Cap, veh/h	153	1849	0	0	1124	341	917	7	822			
Arrive On Green	0.17	0.73	0.00	0.00	0.22	0.22	0.52	0.52	0.52			
Sat Flow, veh/h	1767	5233	0	0	5233	1538	1755	13	1572			
Grp Volume(v), veh/h	91	376	0	0	725	172	274	0	98			
Grp Sat Flow(s),veh/h/ln	1767	1689	0	0	1689	1538	1768	0	1572			
Q Serve(g_s), s	3.8	1.9	0.0	0.0	10.4	7.8	7.0	0.0	2.5			
Cycle Q Clear(g_c), s	3.8	1.9	0.0	0.0	10.4	7.8	7.0	0.0	2.5			
Prop In Lane	1.00		0.00	0.00		1.00	0.99		1.00			
Lane Grp Cap(c), veh/h	153	1849	0	0	1124	341	924	0	822			
V/C Ratio(X)	0.59	0.20	0.00	0.00	0.64	0.50	0.30	0.00	0.12			
Avail Cap(c_a), veh/h	232	2944	0	0	1995	606	924	0	822			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.91	0.91	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.8	7.1	0.0	0.0	28.3	27.3	10.8	0.0	9.7			
Incr Delay (d2), s/veh	3.3	0.0	0.0	0.0	0.6	1.2	0.8	0.0	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			
%ile BackOfQ(50%),veh/ln	1.6	0.6	0.0	0.0	4.1	2.9	2.7	0.0	0.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	7.2	0.0	0.0	28.9	28.4	11.6	0.0	10.0			
LnGrp LOS	D	A	A	A	C	C	B	A	B			
Approach Vol, veh/h		467			897			372				
Approach Delay, s/veh		12.6			28.8			11.2				
Approach LOS		B			C			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		46.3		33.7			11.4	22.3				
Change Period (Y+Rc), s		4.5		4.5			4.5	4.5				
Max Green Setting (Gmax), s		24.5		46.5			10.5	31.5				
Max Q Clear Time (g_c+I1), s		9.0		3.9			5.8	12.4				
Green Ext Time (p_c), s		1.7		2.7			0.1	5.4				

Intersection Summary			
HCM 6th Ctrl Delay			20.7
HCM 6th LOS			C

6: 19 1/2 Avenue & Bush Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	123	353	30	362	225	82	39	68	334
v/c Ratio	0.72	0.35	0.17	0.55	0.87	0.05	0.23	0.06	0.44
Control Delay	61.7	20.8	39.1	32.1	68.2	13.0	40.0	20.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	20.8	39.1	32.1	68.2	13.0	40.0	20.1	4.9
Queue Length 50th (ft)	60	54	14	86	110	8	18	11	0
Queue Length 95th (ft)	#175	106	45	125	#289	28	55	31	62
Internal Link Dist (ft)		133		217		245		183	
Turn Bay Length (ft)	400		49		48		106		354
Base Capacity (vph)	172	1240	172	1243	259	1552	172	1209	759
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.28	0.17	0.29	0.87	0.05	0.23	0.06	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2035 Project AM Signals
6: 19 1/2 Avenue & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (veh/h)	113	231	94	28	308	25	207	53	22	36	63	307
Future Volume (veh/h)	113	231	94	28	308	25	207	53	22	36	63	307
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	123	251	102	30	335	27	225	58	24	39	68	334
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	172	484	191	87	489	39	264	1042	407	171	1298	579
Arrive On Green	0.10	0.20	0.20	0.05	0.15	0.15	0.15	0.42	0.42	0.10	0.37	0.37
Sat Flow, veh/h	1767	2468	975	1767	3306	265	1767	2477	967	1767	3526	1572
Grp Volume(v), veh/h	123	177	176	30	178	184	225	40	42	39	68	334
Grp Sat Flow(s),veh/h/ln	1767	1763	1680	1767	1763	1808	1767	1763	1681	1767	1763	1572
Q Serve(g_s), s	5.1	6.8	7.1	1.2	7.3	7.3	9.4	1.0	1.1	1.5	0.9	13.0
Cycle Q Clear(g_c), s	5.1	6.8	7.1	1.2	7.3	7.3	9.4	1.0	1.1	1.5	0.9	13.0
Prop In Lane	1.00		0.58	1.00		0.15	1.00		0.58	1.00		1.00
Lane Grp Cap(c), veh/h	172	346	329	87	261	268	264	742	708	171	1298	579
V/C Ratio(X)	0.71	0.51	0.53	0.34	0.68	0.69	0.85	0.05	0.06	0.23	0.05	0.58
Avail Cap(c_a), veh/h	186	672	641	186	672	689	279	742	708	186	1298	579
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	33.3	27.3	27.4	35.0	30.7	30.7	31.5	13.1	13.1	31.7	15.5	19.3
Incr Delay (d2), s/veh	11.3	1.2	1.3	2.3	3.1	3.1	20.7	0.1	0.2	0.7	0.1	4.1
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	2.7	2.8	2.8	0.6	3.2	3.3	5.4	0.4	0.4	0.7	0.4	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.6	28.5	28.8	37.3	33.8	33.9	52.2	13.2	13.2	32.4	15.5	23.4
LnGrp LOS	D	C	C	D	C	C	D	B	B	C	B	C
Approach Vol, veh/h		476			392			307			441	
Approach Delay, s/veh		32.8			34.1			41.8			23.0	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.9	36.5	8.3	19.4	15.9	32.5	11.9	15.8
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	8.0	32.0	8.0	29.0	12.0	28.0	8.0	29.0
Max Q Clear Time (g_c+I1), s	3.5	3.1	3.2	9.1	11.4	15.0	7.1	9.3
Green Ext Time (p_c), s	0.0	0.4	0.0	1.9	0.0	1.3	0.0	1.9

Intersection Summary			
HCM 6th Ctrl Delay			32.1
HCM 6th LOS			C

	↗	→	↙	←	↖	↑	↗	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	14	369	233	248	25	2	159	20	6
v/c Ratio	0.11	0.66	0.59	0.26	0.19	0.00	0.17	0.14	0.01
Control Delay	49.8	47.7	37.5	23.0	51.7	19.0	3.9	48.6	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	47.7	37.5	23.0	51.7	19.0	3.9	48.6	13.3
Queue Length 50th (ft)	9	126	24	18	17	1	0	13	1
Queue Length 95th (ft)	30	163	32	0	45	6	42	38	9
Internal Link Dist (ft)		328		768		340			326
Turn Bay Length (ft)			394						
Base Capacity (vph)	152	942	577	1224	133	1027	943	168	901
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.39	0.40	0.20	0.19	0.00	0.17	0.12	0.01

Intersection Summary

	↰	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	13	300	40	214	196	32	23	2	146	18	2	4
Future Volume (veh/h)	13	300	40	214	196	32	23	2	146	18	2	4
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	326	43	233	213	35	25	2	159	20	2	4
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	433	57	306	613	99	510	570	483	546	181	361
Arrive On Green	0.03	0.14	0.14	0.09	0.20	0.20	0.29	0.30	0.30	0.31	0.32	0.32
Sat Flow, veh/h	1781	3160	413	3456	3063	495	1781	1870	1585	1781	557	1113
Grp Volume(v), veh/h	14	182	187	233	122	126	25	2	159	20	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1796	1728	1777	1781	1781	1870	1585	1781	0	1670
Q Serve(g_s), s	0.8	10.8	11.0	7.2	6.5	6.7	1.1	0.1	8.5	0.9	0.0	0.3
Cycle Q Clear(g_c), s	0.8	10.8	11.0	7.2	6.5	6.7	1.1	0.1	8.5	0.9	0.0	0.3
Prop In Lane	1.00		0.23	1.00		0.28	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	45	243	246	306	356	356	510	570	483	546	0	542
V/C Ratio(X)	0.31	0.75	0.76	0.76	0.34	0.35	0.05	0.00	0.33	0.04	0.00	0.01
Avail Cap(c_a), veh/h	154	477	482	581	622	623	510	570	483	546	0	542
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	0.00	1.00
Uniform Delay (d), s/veh	52.7	45.7	45.7	49.0	37.8	37.9	28.4	26.6	29.6	26.8	0.0	25.2
Incr Delay (d2), s/veh	3.8	4.6	4.8	3.9	0.6	0.6	0.0	0.0	1.8	0.0	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	0.4	5.1	5.3	3.2	2.8	2.9	0.5	0.0	3.4	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.5	50.2	50.5	52.9	38.4	38.5	28.4	26.6	31.4	26.8	0.0	25.2
LnGrp LOS	E	D	D	D	D	D	C	C	C	C	A	C
Approach Vol, veh/h		383			481			186			26	
Approach Delay, s/veh		50.6			45.4			30.9			26.4	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	38.2	38.0	14.2	19.6	36.0	40.2	7.3	26.5
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	10.5	33.5	18.5	29.5	8.3	35.7	9.5	38.5
Max Q Clear Time (g_c+I1), s	2.9	10.5	9.2	13.0	3.1	2.3	2.8	8.7
Green Ext Time (p_c), s	0.0	0.5	0.5	2.0	0.0	0.0	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	44.3
HCM 6th LOS	D

2: Semas Drive & Bush Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	16	486	171	505	15	25	88	5	9
v/c Ratio	0.07	0.69	0.67	0.49	0.03	0.19	0.08	0.04	0.01
Control Delay	26.5	20.8	33.2	22.2	0.9	51.7	0.1	48.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.5	20.8	33.2	22.2	0.9	51.7	0.1	48.2	0.0
Queue Length 50th (ft)	11	73	96	186	0	17	0	3	0
Queue Length 95th (ft)	m11	76	167	207	2	45	0	16	0
Internal Link Dist (ft)		1		563					175
Turn Bay Length (ft)									
Base Capacity (vph)	221	1108	345	1528	768	130	1106	136	962
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.44	0.50	0.33	0.02	0.19	0.08	0.04	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	15	437	10	157	465	14	23	0	81	5	0	8
Future Volume (veh/h)	15	437	10	157	465	14	23	0	81	5	0	8
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	475	11	171	505	15	25	0	88	5	0	9
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	601	14	203	655	292	533	1015	860	18	0	402
Arrive On Green	0.10	0.17	0.17	0.11	0.18	0.18	0.30	0.00	0.54	0.01	0.00	0.25
Sat Flow, veh/h	1781	3550	82	1781	3554	1585	1781	1870	1585	1781	0	1585
Grp Volume(v), veh/h	16	237	249	171	505	15	25	0	88	5	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1856	1781	1777	1585	1781	1870	1585	1781	0	1585
Q Serve(g_s), s	0.9	14.1	14.1	10.3	14.9	0.8	1.1	0.0	3.0	0.3	0.0	0.5
Cycle Q Clear(g_c), s	0.9	14.1	14.1	10.3	14.9	0.8	1.1	0.0	3.0	0.3	0.0	0.5
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	301	314	203	655	292	533	1015	860	18	0	402
V/C Ratio(X)	0.09	0.79	0.79	0.84	0.77	0.05	0.05	0.00	0.10	0.27	0.00	0.02
Avail Cap(c_a), veh/h	177	557	582	348	1535	684	533	1015	860	138	0	402
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	0.00	1.00
Uniform Delay (d), s/veh	45.0	43.8	43.8	47.7	42.7	29.1	27.4	0.0	12.2	54.0	0.0	30.8
Incr Delay (d2), s/veh	0.2	4.6	4.5	9.0	2.0	0.1	0.0	0.0	0.2	7.7	0.0	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	0.4	6.4	6.7	5.0	6.5	0.3	0.5	0.0	1.0	0.2	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.3	48.4	48.3	56.7	44.6	29.1	27.4	0.0	12.4	61.8	0.0	30.9
LnGrp LOS	D	D	D	E	D	C	C	A	B	E	A	C
Approach Vol, veh/h		502			691			113			14	
Approach Delay, s/veh		48.3			47.3			15.7			41.9	
Approach LOS		D			D			B			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	64.2	17.1	23.1	37.4	32.4	15.4	24.8
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	27.5	21.5	34.5	8.1	27.9	8.5	47.5
Max Q Clear Time (g_c+I1), s	2.3	5.0	12.3	16.1	3.1	2.5	2.9	16.9
Green Ext Time (p_c), s	0.0	0.2	0.3	2.5	0.0	0.0	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	44.9
HCM 6th LOS	D

	⬏	→	↙	←	↰	↑	↱	↳	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	25	547	175	744	30	8	248	172	42
v/c Ratio	0.20	0.50	0.67	0.40	0.24	0.01	0.32	1.01	0.03
Control Delay	20.0	18.2	44.2	17.0	52.9	24.3	4.7	122.4	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	18.2	44.2	17.0	52.9	24.3	4.7	122.4	10.5
Queue Length 50th (ft)	11	118	90	39	20	1	0	~125	2
Queue Length 95th (ft)	m24	104	#256	22	52	8	59	#266	15
Internal Link Dist (ft)		493		306		135			111
Turn Bay Length (ft)					50		50	75	
Base Capacity (vph)	126	2192	262	2366	127	1428	785	170	1498
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	20	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.25	0.67	0.31	0.24	0.01	0.32	1.01	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑↱		↰	↑↑↑↱		↰	↑↑	↱	↰	↑↱	
Traffic Volume (veh/h)	23	487	17	161	572	112	28	7	228	158	9	29
Future Volume (veh/h)	23	487	17	161	572	112	28	7	228	158	9	29
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		0.98	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	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	25	529	18	175	622	122	30	8	248	172	10	32
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, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	68	823	28	183	1051	198	77	992	442	558	976	871
Arrive On Green	0.04	0.13	0.13	0.21	0.39	0.39	0.04	0.28	0.28	0.32	0.56	0.56
Sat Flow, veh/h	1753	6337	214	1753	5372	1015	1753	3497	1560	1753	1749	1560
Grp Volume(v), veh/h	25	395	152	175	547	197	30	8	248	172	10	32
Grp Sat Flow(s),veh/h/ln	1753	1583	1802	1753	1583	1638	1753	1749	1560	1753	1749	1560
Q Serve(g_s), s	1.5	8.7	8.8	10.9	10.0	10.6	1.8	0.2	14.9	8.2	0.3	1.0
Cycle Q Clear(g_c), s	1.5	8.7	8.8	10.9	10.0	10.6	1.8	0.2	14.9	8.2	0.3	1.0
Prop In Lane	1.00		0.12	1.00		0.62	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	68	617	234	183	929	320	77	992	442	558	976	871
V/C Ratio(X)	0.37	0.64	0.65	0.95	0.59	0.61	0.39	0.01	0.56	0.31	0.01	0.04
Avail Cap(c_a), veh/h	127	1662	631	183	1813	625	127	992	442	558	976	871
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.93	0.93	0.93	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	45.4	45.5	43.2	30.0	30.2	51.2	28.3	33.6	28.3	10.8	11.0
Incr Delay (d2), s/veh	3.3	1.1	3.0	51.1	0.6	1.8	3.2	0.0	5.1	0.3	0.0	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	3.4	4.0	6.7	3.3	3.7	0.9	0.1	6.2	3.4	0.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.8	46.5	48.5	94.3	30.5	31.9	54.4	28.3	38.6	28.7	10.8	11.0
LnGrp LOS	D	D	D	F	C	C	D	C	D	C	B	B
Approach Vol, veh/h		572			919			286			214	
Approach Delay, s/veh		47.4			43.0			40.0			25.2	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.5	35.7	16.0	18.8	9.3	65.9	8.8	26.0
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	10.8	31.2	11.5	38.5	8.0	34.0	8.0	42.0
Max Q Clear Time (g_c+I1), s	10.2	16.9	12.9	10.8	3.8	3.0	3.5	12.6
Green Ext Time (p_c), s	0.0	0.7	0.0	3.5	0.0	0.2	0.0	5.4

Intersection Summary			
HCM 6th Ctrl Delay			41.9
HCM 6th LOS			D

	→	↘	↙	←	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	538	400	136	766	125	155
v/c Ratio	0.56	0.70	0.62	0.43	0.13	0.17
Control Delay	14.3	9.9	41.9	16.2	14.6	3.3
Queue Delay	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	14.3	10.0	41.9	16.2	14.6	3.3
Queue Length 50th (ft)	54	73	60	85	39	0
Queue Length 95th (ft)	m72	m263	163	105	94	38
Internal Link Dist (ft)	306			456	102	
Turn Bay Length (ft)		50	249			466
Base Capacity (vph)	2063	841	370	3332	967	924
Starvation Cap Reductn	0	63	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.51	0.37	0.23	0.13	0.17

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑						↰	↱
Traffic Volume (veh/h)	0	495	368	125	705	0	0	0	0	115	0	143
Future Volume (veh/h)	0	495	368	125	705	0	0	0	0	115	0	143
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	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	538	400	136	766	0				125	0	155
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	1493	463	167	2177	0				850	0	756
Arrive On Green	0.00	0.40	0.40	0.10	0.43	0.00				0.49	0.00	0.49
Sat Flow, veh/h	0	5191	1560	1753	5191	0				1753	0	1559
Grp Volume(v), veh/h	0	538	400	136	766	0				125	0	155
Grp Sat Flow(s),veh/h/ln	0	1675	1560	1753	1675	0				1753	0	1559
Q Serve(g_s), s	0.0	8.3	25.9	8.4	11.2	0.0				4.3	0.0	6.3
Cycle Q Clear(g_c), s	0.0	8.3	25.9	8.4	11.2	0.0				4.3	0.0	6.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1493	463	167	2177	0				850	0	756
V/C Ratio(X)	0.00	0.36	0.86	0.82	0.35	0.00				0.15	0.00	0.20
Avail Cap(c_a), veh/h	0	2079	645	375	3358	0				850	0	756
HCM Platoon Ratio	1.00	1.33	1.33	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.82	0.82	0.81	0.81	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	25.9	31.2	48.8	20.9	0.0				15.7	0.0	16.2
Incr Delay (d2), s/veh	0.0	0.1	7.3	7.6	0.1	0.0				0.4	0.0	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	0.0	3.1	9.6	4.0	4.3	0.0				1.8	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	26.0	38.5	56.5	20.9	0.0				16.1	0.0	16.8
LnGrp LOS	A	C	D	E	C	A				B	A	B
Approach Vol, veh/h		938			902						280	
Approach Delay, s/veh		31.3			26.3						16.5	
Approach LOS		C			C						B	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			15.0	37.2		57.9		52.1				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			23.5	45.5		27.5		73.5				
Max Q Clear Time (g_c+I1), s			10.4	27.9		8.3		13.2				
Green Ext Time (p_c), s			0.3	4.8		1.1		6.2				
Intersection Summary												
HCM 6th Ctrl Delay			27.2									
HCM 6th LOS			C									

5: SR 41 NB Ramp & Bush Street

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	137	526	479	111	424	268
v/c Ratio	0.62	0.31	0.56	0.32	0.42	0.26
Control Delay	46.5	10.5	28.3	3.9	16.7	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	10.5	28.3	3.9	16.7	2.8
Queue Length 50th (ft)	105	27	80	3	148	0
Queue Length 95th (ft)	170	35	65	m3	325	48
Internal Link Dist (ft)		456	98		103	
Turn Bay Length (ft)	114					300
Base Capacity (vph)	296	2540	1487	531	1020	1023
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.21	0.32	0.21	0.42	0.26

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑			↑↑↑	↱		↰↑	↱			
Traffic Volume (veh/h)	126	484	0	0	441	102	389	1	247	0	0	0
Future Volume (veh/h)	126	484	0	0	441	102	389	1	247	0	0	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		0.98	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	0	0	1856	1856	1856	1856	1856			
Adj Flow Rate, veh/h	137	526	0	0	479	111	423	1	268			
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	0	0	3	3	3	3	3			
Cap, veh/h	165	1386	0	0	707	214	1137	3	1014			
Arrive On Green	0.19	0.55	0.00	0.00	0.14	0.14	0.64	0.64	0.64			
Sat Flow, veh/h	1767	5233	0	0	5233	1537	1763	4	1572			
Grp Volume(v), veh/h	137	526	0	0	479	111	424	0	268			
Grp Sat Flow(s),veh/h/ln	1767	1689	0	0	1689	1537	1767	0	1572			
Q Serve(g_s), s	8.2	6.5	0.0	0.0	9.9	7.4	12.3	0.0	8.0			
Cycle Q Clear(g_c), s	8.2	6.5	0.0	0.0	9.9	7.4	12.3	0.0	8.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	165	1386	0	0	707	214	1139	0	1014			
V/C Ratio(X)	0.83	0.38	0.00	0.00	0.68	0.52	0.37	0.00	0.26			
Avail Cap(c_a), veh/h	297	2556	0	0	1497	454	1139	0	1014			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.81	0.81	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	43.9	19.6	0.0	0.0	45.0	43.9	9.1	0.0	8.4			
Incr Delay (d2), s/veh	8.5	0.1	0.0	0.0	1.1	1.9	0.9	0.0	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	3.6	2.2	0.0	0.0	4.2	2.9	4.7	0.0	2.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.4	19.7	0.0	0.0	46.1	45.8	10.1	0.0	9.0			
LnGrp LOS	D	B	A	A	D	D	B	A	A			
Approach Vol, veh/h		663			590			692				
Approach Delay, s/veh		26.5			46.1			9.7				
Approach LOS		C			D			A				

Timer - Assigned Phs		2		4				7	8
Phs Duration (G+Y+Rc), s		75.4		34.6				14.7	19.8
Change Period (Y+Rc), s		4.5		4.5				4.5	4.5
Max Green Setting (Gmax), s		45.5		55.5				18.5	32.5
Max Q Clear Time (g_c+I1), s		14.3		8.5				10.2	11.9
Green Ext Time (p_c), s		4.0		3.9				0.2	3.5

Intersection Summary			
HCM 6th Ctrl Delay			26.4
HCM 6th LOS			C

6: 19 1/2 Avenue & Bush Street

	↱	→	↲	←	↰	↑	↳	↓	↲
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	252	543	36	327	126	111	25	62	160
v/c Ratio	0.79	0.49	0.28	0.59	0.63	0.07	0.20	0.05	0.23
Control Delay	42.8	15.0	54.4	45.5	61.7	15.3	52.0	25.3	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	15.0	54.4	45.5	61.7	15.3	52.0	25.3	5.6
Queue Length 50th (ft)	57	34	25	113	86	16	17	14	0
Queue Length 95th (ft)	#285	44	58	137	#161	42	45	34	50
Internal Link Dist (ft)		133		217		245		183	
Turn Bay Length (ft)	400		49		48		106		354
Base Capacity (vph)	350	1340	127	919	199	1590	127	1346	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.41	0.28	0.36	0.63	0.07	0.20	0.05	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (veh/h)	232	339	161	33	278	23	116	71	31	23	57	147
Future Volume (veh/h)	232	339	161	33	278	23	116	71	31	23	57	147
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	252	368	175	36	302	25	126	77	34	25	62	160
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	283	545	255	86	402	33	513	1250	521	69	929	415
Arrive On Green	0.16	0.23	0.23	0.05	0.12	0.12	0.29	0.52	0.52	0.04	0.26	0.26
Sat Flow, veh/h	1767	2331	1091	1767	3298	271	1767	2425	1011	1767	3526	1572
Grp Volume(v), veh/h	252	277	266	36	161	166	126	55	56	25	62	160
Grp Sat Flow(s),veh/h/ln	1767	1763	1659	1767	1763	1807	1767	1763	1674	1767	1763	1572
Q Serve(g_s), s	15.4	15.7	16.1	2.2	9.7	9.8	6.0	1.7	1.9	1.5	1.4	9.2
Cycle Q Clear(g_c), s	15.4	15.7	16.1	2.2	9.7	9.8	6.0	1.7	1.9	1.5	1.4	9.2
Prop In Lane	1.00		0.66	1.00		0.15	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	283	412	388	86	215	220	513	908	862	69	929	415
V/C Ratio(X)	0.89	0.67	0.69	0.42	0.75	0.76	0.25	0.06	0.07	0.36	0.07	0.39
Avail Cap(c_a), veh/h	345	681	641	129	465	476	513	908	862	129	929	415
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	45.2	38.3	38.5	50.8	46.6	46.7	29.8	13.3	13.4	51.5	30.4	33.2
Incr Delay (d2), s/veh	20.8	1.9	2.2	3.2	5.1	5.2	0.2	0.1	0.1	3.2	0.1	2.7
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	8.3	6.9	6.7	1.0	4.5	4.7	2.6	0.7	0.7	0.7	0.6	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.0	40.2	40.6	54.1	51.7	51.9	30.1	13.5	13.5	54.7	30.5	35.9
LnGrp LOS	E	D	D	D	D	D	C	B	B	D	C	D
Approach Vol, veh/h		795			363			237			247	
Approach Delay, s/veh		48.5			52.0			22.3			36.5	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	61.2	9.8	30.2	36.4	33.5	22.1	17.9
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	8.0	33.5	8.0	42.5	12.5	29.0	21.5	29.0
Max Q Clear Time (g_c+I1), s	3.5	3.9	4.2	18.1	8.0	11.2	17.4	11.8
Green Ext Time (p_c), s	0.0	0.6	0.0	3.3	0.1	0.8	0.3	1.6

Intersection Summary			
HCM 6th Ctrl Delay			43.7
HCM 6th LOS			D

APPENDIX AB

2035 PROJECT CONDITIONS

ROUNDABOUT ALTERNATIVE

INTERSECTION

LEVELS OF SERVICE CALCULATIONS

2035 Project AM Roundabouts Signals
1: College Avenue & Bush Street

08/24/2019

	↗	→	↙	←	↖	↗	↘	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	2	81	416	300	16	283	20	6
v/c Ratio	0.01	0.09	0.46	0.20	0.04	0.27	0.05	0.01
Control Delay	24.5	14.7	22.2	10.5	23.7	0.6	23.8	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	14.7	22.2	10.5	23.7	0.6	23.8	12.7
Queue Length 50th (ft)	0	6	39	13	3	0	4	0
Queue Length 95th (ft)	7	30	#214	94	26	0	31	9
Internal Link Dist (ft)		328		768				287
Turn Bay Length (ft)			394					
Base Capacity (vph)	393	3059	904	3151	393	1440	393	1302
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.03	0.46	0.10	0.04	0.20	0.05	0.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2035 Project AM Roundabouts Signals
1: College Avenue & Bush Street

08/24/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	2	65	9	383	267	9	15	0	260	18	1	5
Future Volume (veh/h)	2	65	9	383	267	9	15	0	260	18	1	5
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	71	10	416	290	10	16	0	283	20	1	5
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	8	536	74	592	1185	41	57	432	366	70	64	322
Arrive On Green	0.00	0.17	0.17	0.17	0.34	0.34	0.03	0.00	0.23	0.04	0.24	0.24
Sat Flow, veh/h	1781	3136	433	3456	3505	121	1781	1870	1585	1781	271	1355
Grp Volume(v), veh/h	2	40	41	416	147	153	16	0	283	20	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1792	1728	1777	1849	1781	1870	1585	1781	0	1626
Q Serve(g_s), s	0.1	0.9	0.9	5.3	2.8	2.8	0.4	0.0	7.8	0.5	0.0	0.1
Cycle Q Clear(g_c), s	0.1	0.9	0.9	5.3	2.8	2.8	0.4	0.0	7.8	0.5	0.0	0.1
Prop In Lane	1.00		0.24	1.00		0.07	1.00		1.00	1.00		0.83
Lane Grp Cap(c), veh/h	8	304	307	592	601	625	57	432	366	70	0	387
V/C Ratio(X)	0.26	0.13	0.14	0.70	0.24	0.25	0.28	0.00	0.77	0.29	0.00	0.02
Avail Cap(c_a), veh/h	307	1454	1467	707	1511	1572	307	1269	1075	307	0	1103
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	0.00	1.00
Uniform Delay (d), s/veh	23.0	16.3	16.3	18.1	11.1	11.1	22.0	0.0	16.7	21.7	0.0	13.5
Incr Delay (d2), s/veh	16.3	0.2	0.2	2.5	0.2	0.2	2.6	0.0	3.5	2.2	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	0.1	0.3	0.4	1.9	0.9	0.9	0.2	0.0	2.6	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	16.5	16.5	20.6	11.3	11.3	24.6	0.0	20.2	23.9	0.0	13.6
LnGrp LOS	D	B	B	C	B	B	C	A	C	C	A	B
Approach Vol, veh/h		83			716			299			26	
Approach Delay, s/veh		17.1			16.7			20.5			21.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.3	15.2	12.5	12.4	6.0	15.5	4.7	20.2
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	8.0	31.5	9.5	38.0	8.0	31.5	8.0	39.5
Max Q Clear Time (g_c+I1), s	2.5	9.8	7.3	2.9	2.4	2.1	2.1	4.8
Green Ext Time (p_c), s	0.0	1.0	0.4	0.4	0.0	0.0	0.0	1.7

Intersection Summary			
HCM 6th Ctrl Delay			17.9
HCM 6th LOS			B

2: Semas Drive & Bush Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	2	425	41	684	5	15	100	3	7
v/c Ratio	0.00	0.32	0.09	0.51	0.01	0.03	0.12	0.01	0.01
Control Delay	24.0	11.1	21.9	12.7	0.0	22.8	0.3	23.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	11.1	21.9	12.7	0.0	22.8	0.3	23.7	0.0
Queue Length 50th (ft)	0	19	4	34	0	2	0	0	0
Queue Length 95th (ft)	8	129	54	216	0	27	0	10	0
Internal Link Dist (ft)		1		563					32
Turn Bay Length (ft)									
Base Capacity (vph)	441	3068	441	3083	1395	441	1314	441	1281
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.14	0.09	0.22	0.00	0.03	0.08	0.01	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	2	378	13	38	629	5	14	0	92	3	0	6
Future Volume (veh/h)	2	378	13	38	629	5	14	0	92	3	0	6
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	411	14	41	684	5	15	0	100	3	0	7
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	8	892	30	130	1148	512	55	415	351	12	0	313
Arrive On Green	0.00	0.25	0.25	0.07	0.32	0.32	0.03	0.00	0.22	0.01	0.00	0.20
Sat Flow, veh/h	1781	3507	119	1781	3554	1585	1781	1870	1585	1781	0	1585
Grp Volume(v), veh/h	2	208	217	41	684	5	15	0	100	3	0	7
Grp Sat Flow(s),veh/h/ln	1781	1777	1849	1781	1777	1585	1781	1870	1585	1781	0	1585
Q Serve(g_s), s	0.0	4.0	4.0	0.9	6.5	0.1	0.3	0.0	2.1	0.1	0.0	0.1
Cycle Q Clear(g_c), s	0.0	4.0	4.0	0.9	6.5	0.1	0.3	0.0	2.1	0.1	0.0	0.1
Prop In Lane	1.00		0.06	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	8	452	470	130	1148	512	55	415	351	12	0	313
V/C Ratio(X)	0.26	0.46	0.46	0.32	0.60	0.01	0.27	0.00	0.28	0.26	0.00	0.02
Avail Cap(c_a), veh/h	352	1404	1461	352	2808	1252	352	1108	939	352	0	939
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	0.00	1.00
Uniform Delay (d), s/veh	20.1	12.7	12.8	17.8	11.5	9.3	19.2	0.0	13.1	20.0	0.0	13.1
Incr Delay (d2), s/veh	16.3	0.7	0.7	1.4	0.5	0.0	2.7	0.0	0.4	11.1	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	0.1	1.3	1.3	0.3	1.9	0.0	0.2	0.0	0.6	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.4	13.5	13.5	19.2	12.0	9.3	21.9	0.0	13.5	31.2	0.0	13.1
LnGrp LOS	D	B	B	B	B	A	C	A	B	C	A	B
Approach Vol, veh/h		427			730			115			10	
Approach Delay, s/veh		13.6			12.4			14.6			18.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.8	13.5	7.5	14.8	5.7	12.5	4.7	17.6
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	8.0	24.0	8.0	32.0	8.0	24.0	8.0	32.0
Max Q Clear Time (g_c+I1), s	2.1	4.1	2.9	6.0	2.3	2.1	2.0	8.5
Green Ext Time (p_c), s	0.0	0.2	0.0	2.3	0.0	0.0	0.0	4.5

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	530	814	89	134
Demand Flow Rate, veh/h	551	847	93	139
Vehicles Circulating, veh/h	117	48	613	768
Vehicles Exiting, veh/h	790	658	55	127
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.7	9.5	5.6	6.6
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	L	TR	L	TR	LTR	L	TR
Assumed Moves	L	TR	L	TR	LTR	L	TR
RT Channelized							
Lane Util	0.060	0.940	0.034	0.966	1.000	0.633	0.367
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	33	518	29	818	93	88	51
Cap Entry Lane, veh/h	1212	1286	1292	1363	843	666	739
Entry HV Adj Factor	0.970	0.962	0.966	0.961	0.957	0.966	0.961
Flow Entry, veh/h	32	498	28	786	89	85	49
Cap Entry, veh/h	1175	1236	1247	1310	807	643	710
V/C Ratio	0.027	0.403	0.022	0.600	0.110	0.132	0.069
Control Delay, s/veh	3.3	6.9	3.1	9.8	5.6	7.1	5.8
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	0	2	0	4	0	0	0

Intersection	
Intersection Delay, s/veh	6.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	621	997	0	196
Demand Flow Rate, veh/h	646	1037	0	204
Vehicles Circulating, veh/h	393	0	486	1037
Vehicles Exiting, veh/h	848	486	553	0
Ped Vol Crossing Leg, #/h	1	1	0	0
Ped Cap Adj	0.999	0.999	1.000	1.000
Approach Delay, s/veh	7.4	6.2	0.0	9.3
Approach LOS	A	A	-	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	T	L	TR
Assumed Moves	LT	TR	LT	TR	T	L	TR
RT Channelized							
Lane Util	0.471	0.529	0.470	0.530	1.000	0.328	0.672
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	304	342	487	550	0	67	137
Cap Entry Lane, veh/h	940	1017	1350	1420	939	520	588
Entry HV Adj Factor	0.960	0.962	0.962	0.960	1.000	0.955	0.964
Flow Entry, veh/h	292	329	468	528	0	64	132
Cap Entry, veh/h	902	978	1297	1362	939	497	567
V/C Ratio	0.324	0.337	0.361	0.388	0.000	0.129	0.233
Control Delay, s/veh	7.5	7.2	6.1	6.2	3.8	9.0	9.4
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	1	1	2	2	0	0	1

5: SR 41 NB Ramp & Bush Street

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	467	897	372	0
Demand Flow Rate, veh/h	481	924	383	0
Vehicles Circulating, veh/h	0	376	481	1027
Vehicles Exiting, veh/h	1027	488	0	273
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.1	9.3	7.2	0.0
Approach LOS	A	A	A	-

Lane	Left	Right	Left	Right	Left	Right	Left
Designated Moves	LT	TR	LT	TR	LT	R	T
Assumed Moves	LT	TR	LT	TR	LT	R	T
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	0.736	0.264	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328
Entry Flow, veh/h	226	255	434	490	282	101	0
Cap Entry Lane, veh/h	1350	1420	955	1032	867	943	593
Entry HV Adj Factor	0.971	0.970	0.972	0.970	0.971	0.970	1.000
Flow Entry, veh/h	219	247	422	476	274	98	0
Cap Entry, veh/h	1310	1378	928	1001	842	915	593
V/C Ratio	0.167	0.180	0.454	0.475	0.325	0.107	0.000
Control Delay, s/veh	4.1	4.1	9.3	9.2	7.9	4.9	6.1
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	1	1	2	3	1	0	0

	↗	→	↙	←	↖	↑	↘	↓	↙
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	123	353	30	362	225	82	39	68	334
v/c Ratio	0.54	0.30	0.13	0.50	0.66	0.06	0.17	0.11	0.61
Control Delay	41.0	15.4	31.9	24.3	38.7	13.4	32.2	23.2	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	15.4	31.9	24.3	38.7	13.4	32.2	23.2	8.4
Queue Length 50th (ft)	40	31	9	57	70	5	12	11	0
Queue Length 95th (ft)	#175	106	45	125	#289	28	55	31	62
Internal Link Dist (ft)		133		217		245		183	
Turn Bay Length (ft)	400		49		48		106		354
Base Capacity (vph)	228	1618	228	1641	342	1757	228	1598	896
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.22	0.13	0.22	0.66	0.05	0.17	0.04	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (veh/h)	113	231	94	28	308	25	207	53	22	36	63	307
Future Volume (veh/h)	113	231	94	28	308	25	207	53	22	36	63	307
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	123	251	102	30	335	27	225	58	24	39	68	334
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	208	562	222	93	537	43	276	865	338	113	907	404
Arrive On Green	0.12	0.23	0.23	0.05	0.16	0.16	0.16	0.35	0.35	0.06	0.26	0.26
Sat Flow, veh/h	1767	2468	975	1767	3306	265	1767	2477	967	1767	3526	1572
Grp Volume(v), veh/h	123	177	176	30	178	184	225	40	42	39	68	334
Grp Sat Flow(s),veh/h/ln	1767	1763	1680	1767	1763	1808	1767	1763	1681	1767	1763	1572
Q Serve(g_s), s	3.9	5.1	5.3	1.0	5.5	5.6	7.2	0.9	1.0	1.2	0.9	11.8
Cycle Q Clear(g_c), s	3.9	5.1	5.3	1.0	5.5	5.6	7.2	0.9	1.0	1.2	0.9	11.8
Prop In Lane	1.00		0.58	1.00		0.15	1.00		0.58	1.00		1.00
Lane Grp Cap(c), veh/h	208	401	382	93	286	294	276	615	587	113	907	404
V/C Ratio(X)	0.59	0.44	0.46	0.32	0.62	0.63	0.82	0.07	0.07	0.34	0.07	0.83
Avail Cap(c_a), veh/h	241	870	829	241	870	893	361	960	916	241	1681	750
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	24.6	19.5	19.6	26.8	22.9	22.9	24.0	12.7	12.8	26.3	16.5	20.6
Incr Delay (d2), s/veh	2.9	0.8	0.9	2.0	2.2	2.2	10.5	0.0	0.1	1.8	0.0	4.3
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	1.7	2.0	2.0	0.4	2.3	2.3	3.6	0.3	0.3	0.5	0.3	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.4	20.2	20.4	28.8	25.1	25.1	34.5	12.8	12.8	28.1	16.6	24.9
LnGrp LOS	C	C	C	C	C	C	C	B	B	C	B	C
Approach Vol, veh/h		476			392			307			441	
Approach Delay, s/veh		22.2			25.4			28.7			23.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	25.0	7.6	17.9	13.7	19.6	11.4	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	8.0	32.0	8.0	29.0	12.0	28.0	8.0	29.0
Max Q Clear Time (g_c+I1), s	3.2	3.0	3.0	7.3	9.2	13.8	5.9	7.6
Green Ext Time (p_c), s	0.0	0.4	0.0	2.0	0.2	1.3	0.1	2.0

Intersection Summary			
HCM 6th Ctrl Delay			24.7
HCM 6th LOS			C

2035 Project PM Roundabouts Signals
1: College Avenue & Bush Street

08/24/2019

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	14	369	233	248	25	2	159	20	6
v/c Ratio	0.04	0.42	0.35	0.14	0.08	0.00	0.34	0.06	0.02
Control Delay	24.6	17.2	22.3	9.3	24.7	18.0	6.4	24.6	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	17.2	22.3	9.3	24.7	18.0	6.4	24.6	14.2
Queue Length 50th (ft)	2	34	22	10	4	0	0	4	0
Queue Length 95th (ft)	24	115	97	75	36	6	43	31	10
Internal Link Dist (ft)		328		768		340			287
Turn Bay Length (ft)			394						
Base Capacity (vph)	322	2998	757	3051	322	1325	1172	322	1193
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.12	0.31	0.08	0.08	0.00	0.14	0.06	0.01

Intersection Summary

1: College Avenue & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	13	300	40	214	196	32	23	2	146	18	2	4
Future Volume (veh/h)	13	300	40	214	196	32	23	2	146	18	2	4
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	14	326	43	233	213	35	25	2	159	20	2	4
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	51	613	80	589	1029	166	85	354	300	70	101	201
Arrive On Green	0.03	0.19	0.19	0.17	0.34	0.34	0.05	0.19	0.19	0.04	0.18	0.18
Sat Flow, veh/h	1781	3160	413	3456	3063	495	1781	1870	1585	1781	557	1113
Grp Volume(v), veh/h	14	182	187	233	122	126	25	2	159	20	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1796	1728	1777	1781	1781	1870	1585	1781	0	1670
Q Serve(g_s), s	0.3	4.1	4.1	2.7	2.2	2.2	0.6	0.0	4.0	0.5	0.0	0.1
Cycle Q Clear(g_c), s	0.3	4.1	4.1	2.7	2.2	2.2	0.6	0.0	4.0	0.5	0.0	0.1
Prop In Lane	1.00		0.23	1.00		0.28	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	51	345	348	589	597	598	85	354	300	70	0	302
V/C Ratio(X)	0.27	0.53	0.54	0.40	0.20	0.21	0.29	0.01	0.53	0.28	0.00	0.02
Avail Cap(c_a), veh/h	322	1526	1543	758	1594	1598	322	1323	1121	322	0	1181
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	0.00	1.00
Uniform Delay (d), s/veh	21.0	16.0	16.0	16.3	10.5	10.5	20.3	14.6	16.2	20.6	0.0	14.9
Incr Delay (d2), s/veh	2.9	1.3	1.3	0.4	0.2	0.2	1.9	0.0	1.5	2.2	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	0.2	1.6	1.6	0.9	0.7	0.7	0.3	0.0	1.3	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	17.3	17.3	16.8	10.6	10.7	22.2	14.6	17.6	22.8	0.0	14.9
LnGrp LOS	C	B	B	B	B	B	C	B	B	C	A	B
Approach Vol, veh/h		383			481			186			26	
Approach Delay, s/veh		17.5			13.6			18.2			21.0	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	12.9	12.0	13.1	6.6	12.5	5.8	19.4
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	8.0	31.3	9.7	38.0	8.0	31.3	8.0	39.7
Max Q Clear Time (g_c+I1), s	2.5	6.0	4.7	6.1	2.6	2.1	2.3	4.2
Green Ext Time (p_c), s	0.0	0.5	0.3	2.4	0.0	0.0	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

	↗	→	↙	←	↖	↖	↗	↘	↓
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	16	486	171	505	15	25	88	5	9
v/c Ratio	0.05	0.48	0.55	0.27	0.02	0.08	0.12	0.02	0.01
Control Delay	26.3	16.8	33.7	9.8	0.0	26.4	0.4	26.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	16.8	33.7	9.8	0.0	26.4	0.4	26.8	0.0
Queue Length 50th (ft)	3	47	34	23	0	5	0	1	0
Queue Length 95th (ft)	28	148	#236	155	0	38	0	13	0
Internal Link Dist (ft)		1		563					32
Turn Bay Length (ft)									
Base Capacity (vph)	313	2496	313	2503	1156	313	1063	313	1037
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.19	0.55	0.20	0.01	0.08	0.08	0.02	0.01

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2035 Project PM Roundabouts Signals
2: Semas Drive & Bush Street

08/24/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	15	437	10	157	465	14	23	0	81	5	0	8
Future Volume (veh/h)	15	437	10	157	465	14	23	0	81	5	0	8
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	475	11	171	505	15	25	0	88	5	0	9
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	794	18	278	1234	550	85	399	338	19	0	279
Arrive On Green	0.03	0.22	0.22	0.16	0.35	0.35	0.05	0.00	0.21	0.01	0.00	0.18
Sat Flow, veh/h	1781	3550	82	1781	3554	1585	1781	1870	1585	1781	0	1585
Grp Volume(v), veh/h	16	237	249	171	505	15	25	0	88	5	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1856	1781	1777	1585	1781	1870	1585	1781	0	1585
Q Serve(g_s), s	0.4	5.4	5.4	4.1	4.9	0.3	0.6	0.0	2.1	0.1	0.0	0.2
Cycle Q Clear(g_c), s	0.4	5.4	5.4	4.1	4.9	0.3	0.6	0.0	2.1	0.1	0.0	0.2
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	57	397	415	278	1234	550	85	399	338	19	0	279
V/C Ratio(X)	0.28	0.60	0.60	0.62	0.41	0.03	0.29	0.00	0.26	0.26	0.00	0.03
Avail Cap(c_a), veh/h	314	1253	1309	314	2506	1118	314	989	838	314	0	838
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	0.00	1.00
Uniform Delay (d), s/veh	21.4	15.8	15.8	17.9	11.3	9.8	20.9	0.0	14.9	22.3	0.0	15.5
Incr Delay (d2), s/veh	2.6	1.4	1.4	2.9	0.2	0.0	1.9	0.0	0.4	7.0	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	0.2	1.9	2.0	1.6	1.5	0.1	0.3	0.0	0.6	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	17.2	17.2	20.8	11.5	9.8	22.8	0.0	15.3	29.3	0.0	15.5
LnGrp LOS	C	B	B	C	B	A	C	A	B	C	A	B
Approach Vol, veh/h		502			691			113			14	
Approach Delay, s/veh		17.4			13.8			16.9			20.4	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.0	14.2	11.6	14.6	6.7	12.5	6.0	20.3
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	8.0	24.0	8.0	32.0	8.0	24.0	8.0	32.0
Max Q Clear Time (g_c+I1), s	2.1	4.1	6.1	7.4	2.6	2.2	2.4	6.9
Green Ext Time (p_c), s	0.0	0.2	0.1	2.7	0.0	0.0	0.0	3.3

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	572	919	286	214
Demand Flow Rate, veh/h	595	956	297	222
Vehicles Circulating, veh/h	371	65	755	860
Vehicles Exiting, veh/h	711	987	211	161
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.4	8.4	10.3	9.3
Approach LOS	B	A	B	A

Lane	Left	Right	Left	Right	Left		Left	Right
Designated Moves	L	TR	L	TR	LTR		L	TR
Assumed Moves	L	TR	L	TR	LTR		L	TR
RT Channelized								
Lane Util	0.044	0.956	0.190	0.810	1.000		0.806	0.194
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535		2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328		4.645	4.328
Entry Flow, veh/h	26	569	182	774	297		179	43
Cap Entry Lane, veh/h	960	1036	1271	1344	747		612	684
Entry HV Adj Factor	0.962	0.961	0.962	0.961	0.962		0.961	0.968
Flow Entry, veh/h	25	547	175	744	286		172	42
Cap Entry, veh/h	923	996	1223	1292	719		588	662
V/C Ratio	0.027	0.549	0.143	0.576	0.397		0.293	0.063
Control Delay, s/veh	4.1	10.7	4.2	9.4	10.3		10.1	6.1
LOS	A	B	A	A	B		B	A
95th %tile Queue, veh	0	3	0	4	2		1	0

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	938	902	0	280
Demand Flow Rate, veh/h	976	938	0	291
Vehicles Circulating, veh/h	271	0	690	938
Vehicles Exiting, veh/h	958	690	557	0
Ped Vol Crossing Leg, #/h	1	1	0	0
Ped Cap Adj	0.999	0.999	1.000	1.000
Approach Delay, s/veh	8.4	5.8	0.0	9.3
Approach LOS	A	A	-	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	T	L	TR
Assumed Moves	LT	TR	LT	TR	T	L	TR
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.447	0.553
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	459	517	441	497	0	130	161
Cap Entry Lane, veh/h	1052	1128	1350	1420	790	570	640
Entry HV Adj Factor	0.961	0.962	0.962	0.962	1.000	0.962	0.963
Flow Entry, veh/h	441	497	424	478	0	125	155
Cap Entry, veh/h	1010	1084	1297	1365	790	548	616
V/C Ratio	0.437	0.459	0.327	0.350	0.000	0.228	0.252
Control Delay, s/veh	8.5	8.4	5.8	5.8	4.6	9.6	9.1
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	2	2	1	2	0	1	1

Intersection	
Intersection Delay, s/veh	9.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	663	590	692	0
Demand Flow Rate, veh/h	683	607	713	0
Vehicles Circulating, veh/h	0	578	683	929
Vehicles Exiting, veh/h	929	818	0	256
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.8	8.8	13.1	0.0
Approach LOS	A	A	B	-

Lane	Left	Right	Left	Right	Left	Right	Left
Designated Moves	LT	TR	LT	TR	LT	R	T
Assumed Moves	LT	TR	LT	TR	LT	R	T
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	0.613	0.387	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328
Entry Flow, veh/h	321	362	285	322	437	276	0
Cap Entry Lane, veh/h	1350	1420	793	869	720	795	645
Entry HV Adj Factor	0.971	0.971	0.972	0.971	0.970	0.971	1.000
Flow Entry, veh/h	312	352	277	313	424	268	0
Cap Entry, veh/h	1311	1379	771	843	699	772	645
V/C Ratio	0.238	0.255	0.359	0.371	0.607	0.347	0.000
Control Delay, s/veh	4.8	4.8	9.1	8.6	15.8	8.9	5.6
LOS	A	A	A	A	C	A	A
95th %tile Queue, veh	1	1	2	2	4	2	0

2035 Project PM Roundabouts Signals
6: 19 1/2 Avenue & Bush Street

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	252	543	36	327	126	111	25	62	160
v/c Ratio	0.75	0.39	0.16	0.46	0.54	0.09	0.11	0.10	0.39
Control Delay	44.2	14.1	31.6	23.6	40.6	12.7	31.4	22.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	14.1	31.6	23.6	40.6	12.7	31.4	22.7	7.7
Queue Length 50th (ft)	78	44	11	50	39	8	7	9	0
Queue Length 95th (ft)	#334	155	51	113	#178	37	40	29	44
Internal Link Dist (ft)		133		217		245		183	
Turn Bay Length (ft)	400		49		48		106		354
Base Capacity (vph)	334	1840	232	1671	232	1598	232	1656	825
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.30	0.16	0.20	0.54	0.07	0.11	0.04	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

6: 19 1/2 Avenue & Bush Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↑	↱
Traffic Volume (veh/h)	232	339	161	33	278	23	116	71	31	23	57	147
Future Volume (veh/h)	232	339	161	33	278	23	116	71	31	23	57	147
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	252	368	175	36	302	25	126	77	34	25	62	160
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	311	642	300	112	536	44	236	604	252	83	573	256
Arrive On Green	0.18	0.28	0.28	0.06	0.16	0.16	0.13	0.25	0.25	0.05	0.16	0.16
Sat Flow, veh/h	1767	2331	1091	1767	3298	271	1767	2425	1011	1767	3526	1572
Grp Volume(v), veh/h	252	277	266	36	161	166	126	55	56	25	62	160
Grp Sat Flow(s),veh/h/ln	1767	1763	1659	1767	1763	1807	1767	1763	1674	1767	1763	1572
Q Serve(g_s), s	6.7	6.6	6.8	1.0	4.1	4.2	3.3	1.2	1.3	0.7	0.7	4.7
Cycle Q Clear(g_c), s	6.7	6.6	6.8	1.0	4.1	4.2	3.3	1.2	1.3	0.7	0.7	4.7
Prop In Lane	1.00		0.66	1.00		0.15	1.00		0.60	1.00		1.00
Lane Grp Cap(c), veh/h	311	485	457	112	286	294	236	439	417	83	573	256
V/C Ratio(X)	0.81	0.57	0.58	0.32	0.56	0.57	0.53	0.12	0.14	0.30	0.11	0.63
Avail Cap(c_a), veh/h	413	1164	1095	287	1038	1064	287	1020	969	287	2041	910
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	19.5	15.3	15.4	22.1	19.0	19.0	19.9	14.3	14.4	22.7	17.6	19.2
Incr Delay (d2), s/veh	8.7	1.1	1.2	1.6	1.7	1.7	1.9	0.1	0.1	2.0	0.1	2.5
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	3.1	2.4	2.3	0.4	1.6	1.7	1.3	0.4	0.4	0.3	0.3	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	16.4	16.6	23.7	20.7	20.7	21.8	14.5	14.5	24.7	17.7	21.7
LnGrp LOS	C	B	B	C	C	C	C	B	B	C	B	C
Approach Vol, veh/h		795			363			237			247	
Approach Delay, s/veh		20.2			21.0			18.4			21.0	
Approach LOS		C			C			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	16.8	7.6	18.1	11.1	12.5	13.2	12.5				
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	8.0	28.5	8.0	32.5	8.0	28.5	11.5	29.0				
Max Q Clear Time (g_c+I1), s	2.7	3.3	3.0	8.8	5.3	6.7	8.7	6.2				
Green Ext Time (p_c), s	0.0	0.5	0.0	3.3	0.1	0.8	0.2	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			20.2									
HCM 6th LOS			C									

APPENDIX F

LETTER TO SANTA ROSA RANCHERIA TACHI YOKUT TRIBE

City of
LEMOORE
CALIFORNIA

711 W. Cinnamon Drive • Lemoore, CA 93245 • (559) 924-6744

March 12, 2020

The Honorable Leo Sisco
Chairman, Santa Rosa Rancheria Tachi Yokut Tribe
16835 Alkali Drive/P.O Box 8
Lemoore, CA 93245
Attn: Shana Powers
Director, SRR Cultural Department

lmcgee@tachi-yokut-nsn.gov

RE: Tribal Cultural Resources under the California Environmental Quality Act, AB 52 (Gatto, 2014). A Formal Notification for Consultation Opportunity of Proposed Project within the Geographic Area of Traditional and Cultural Affiliation, pursuant to Public Resources Code § 21080.3.1 (hereafter PRC).

Dear Mr. Sisco,

The City of Lemoore (City) is proposing to undertake the following project:

Lennar Homes – Application for Proposed Housing Subdivision: A request by Lennar Homes to construct a roughly 77.5-acre housing subdivision. The site is located west of SR 41 at the southeast corner of Bush Street and College Avenue (APN 023-480-031 and 023-510-040).

Pursuant to PRC § 21080.3.1 (b), you have 30 days from the receipt of this letter to request consultation, in writing, with the City. We recommend that your request be sent via certified U.S. Mail, with return receipt. Please address your request to the City as follows:

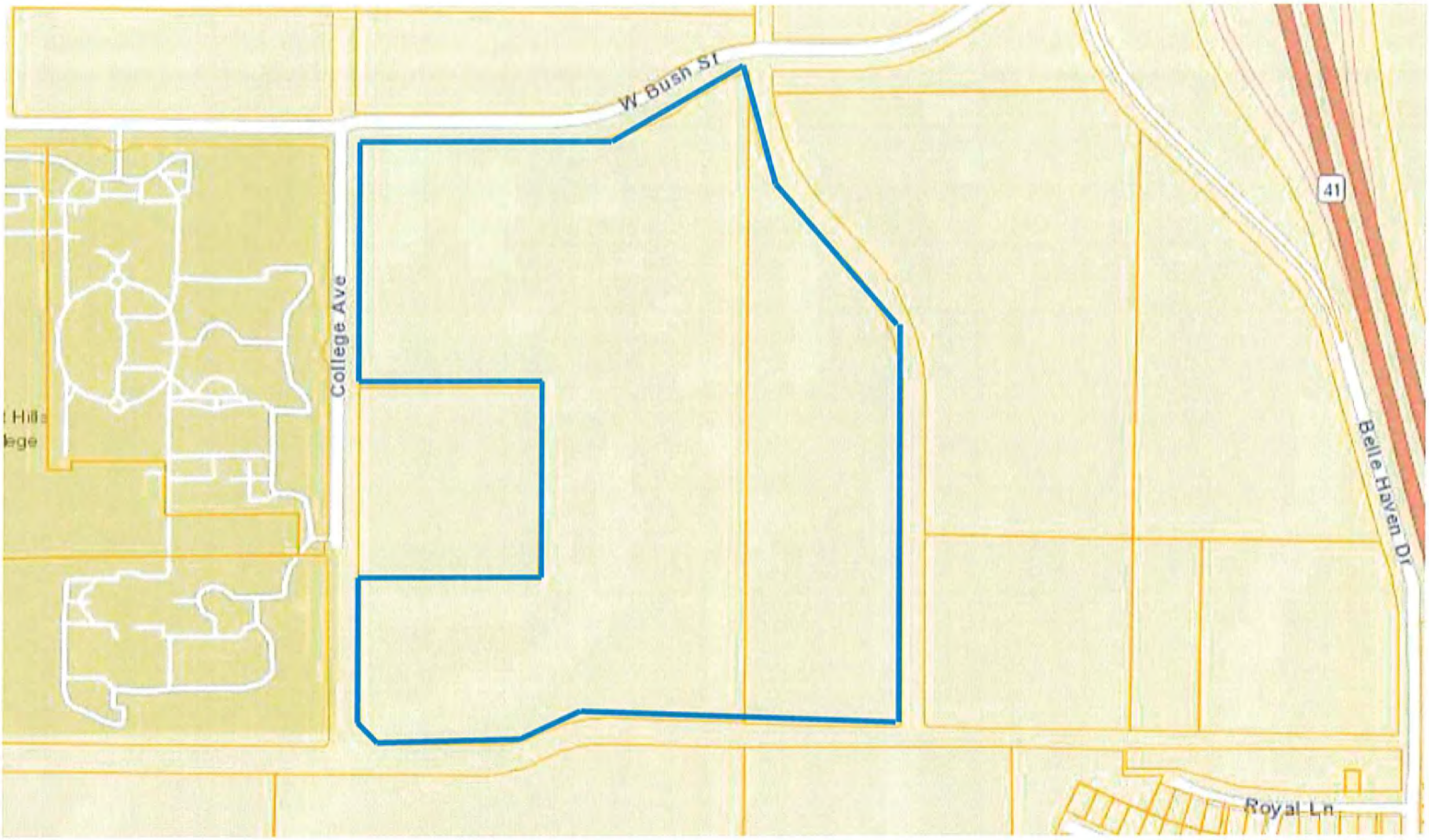
City of Lemoore
ATTN: Judy Holwell, Community Development Director
711 W. Cinnamon Drive
Lemoore, CA 93230

Should you have any comments or questions, please contact our designated representative, Judy Holwell, at (559) 924-6744, ext. 704 or jholwell@lemoore.com.

Sincerely,

Judy Holwell
Community Development Director

Vicinity Map



APN's 023-480-031 and 023-510-040

Area Highlighted in Blue

Department of Toxic Substances Control

Jared Blumenfeld
Secretary for
Environmental Protection

Meredith Williams, Ph.D.
Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Gavin Newsom
Governor

May 4, 2020

Ms. Judy Holwell
City of Lemoore
711 West Cinnamon Drive
Lemoore, California 95345
jholwell@lemoore.com

MITIGATED NEGATIVE DECLARATION FOR LENNAR HOMES TENTATIVE TRACT MAP 848– DATED APRIL 2020 (STATE CLEARINGHOUSE NUMBER: UNKNOWN)

Dear Ms. Holwell:

The Department of Toxic Substances Control (DTSC) received a Mitigated Negative Declaration (MND) for Lennar Homes Tentative Tract Map 848. The Project is a residential subdivision that requires a General Plan Amendment (GPA No. 2020-02), Major Site Plan Review (SPR No. 2020-01), Planned Unit Development (PUD No. 2020-01), Zone Change (ZMA No. 2020-02), and Tentative Tract Map (TTM 848), within Assessor's Parcel Numbers (APNs) 023-510-040 and 023-480-031, which total approximately 54.1 acres in area.

DTSC recommends that the following issues be evaluated in the MND Hazards and Hazardous Materials section:

1. The MND should acknowledge the potential for historic or future activities on or near the project site to result in the release of hazardous wastes/substances on the project site. In instances in which releases have occurred or may occur, further studies should be carried out to delineate the nature and extent of the contamination, and the potential threat to public health and/or the environment should be evaluated. The MND should also identify the mechanism(s) to initiate any required investigation and/or remediation and the government agency who will be responsible for providing appropriate regulatory oversight.
2. Refiners in the United States started adding lead compounds to gasoline in the 1920s in order to boost octane levels and improve engine performance. This practice did not officially end until 1992 when lead was banned as a fuel additive in California. Tailpipe emissions from automobiles using leaded gasoline contained lead and resulted in aerially deposited lead (ADL) being deposited in

and along roadways throughout the state. ADL-contaminated soils still exist along roadsides and medians and can also be found underneath some existing road surfaces due to past construction activities. Due to the potential for ADL-contaminated soil, DTSC recommends collecting soil samples for lead analysis prior to performing any intrusive activities for the project described in the MND.

3. If any sites within the project area or sites located within the vicinity of the project have been used or are suspected of having been used for mining activities, proper investigation for mine waste should be discussed in the MND. DTSC recommends that any project sites with current and/or former mining operations onsite or in the project site area should be evaluated for mine waste according to DTSC's 1998 Abandoned Mine Land Mines Preliminary Assessment Handbook (https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/11/aml_handbook.pdf).

4. If buildings or other structures are to be demolished on any project sites included in the proposed project, surveys should be conducted for the presence of lead-based paints or products, mercury, asbestos containing materials, and polychlorinated biphenyl caulk. Removal, demolition and disposal of any of the above-mentioned chemicals should be conducted in compliance with California environmental regulations and policies. In addition, sampling near current and/or former buildings should be conducted in accordance with DTSC's 2006 *Interim Guidance Evaluation of School Sites with Potential Contamination from Lead Based Paint, Termiticides, and Electrical Transformers* (https://dtsc.ca.gov/wpcontent/uploads/sites/31/2018/09/Guidance_Lead_Contamination_050118.pdf).

5. If any projects initiated as part of the proposed project require the importation of soil to backfill any excavated areas, proper sampling should be conducted to ensure that the imported soil is free of contamination. DTSC recommends the imported materials be characterized according to *DTSC's 2001 Information Advisory Clean Imported Fill Material* (https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/09/SMP_FS_Cleanfill-Schools.pdf).

6. If any sites included as part of the proposed project have been used for agricultural, weed abatement or related activities, proper investigation for organochlorinated pesticides should be discussed in the MND. DTSC recommends the current and former agricultural lands be evaluated in accordance with DTSC's 2008 *Interim Guidance for Sampling Agricultural Properties (Third Revision)* (https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/09/Ag-Guidance-Rev-3-August-7-2008-2.pdf).

DTSC appreciates the opportunity to comment on the MND. Should you need any assistance with an environmental investigation, please submit a request for Lead Agency Oversight Application, which can be found at: https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/09/VCP_App-1460.doc. Additional information regarding voluntary agreements with DTSC can be found at: https://dtsc.ca.gov/brownfields/.

If you have any questions, please contact me at (916) 255-3710 or via email at Gavin.McCreary@dtsc.ca.gov.

Sincerely,

Gavin McCreary

Gavin McCreary
Project Manager
Site Evaluation and Remediation Unit
Site Mitigation and Restoration Program
Department of Toxic Substances Control

cc: (via email)

Governor’s Office of Planning and Research
State Clearinghouse
State.Clearinghouse@opr.ca.gov

Ms. Lora Jameson, Chief
Site Evaluation and Remediation Unit
Department of Toxic Substances Control
Lora.Jameson@dtsc.ca.gov

Mr. Dave Kereazis
Office of Planning & Environmental Analysis
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

Pacific Gas and Electric Company

Plan Review Team
Land Management

PGEPlanReview@pge.com

6111 Bollinger Canyon Road 3370A
San Ramon, CA 94583

April 29, 2020

Judy Holwell
City of Lemoore
711 W Cinnamon Dr
Lemoore, CA 93245

Ref: Gas and Electric Transmission and Distribution

Dear Judy Holwell,

Thank you for submitting the 362-Lot Single Family Subdivision plans for our review. PG&E will review the submitted plans in relationship to any existing Gas and Electric facilities within the project area. If the proposed project is adjacent/or within PG&E owned property and/or easements, we will be working with you to ensure compatible uses and activities near our facilities.

Attached you will find information and requirements as it relates to Gas facilities (Attachment 1) and Electric facilities (Attachment 2). Please review these in detail, as it is critical to ensure your safety and to protect PG&E's facilities and its existing rights.

Below is additional information for your review:

1. This plan review process does not replace the application process for PG&E gas or electric service your project may require. For these requests, please continue to work with PG&E Service Planning: https://www.pge.com/en_US/business/services/building-and-renovation/overview/overview.page.

2. If the project being submitted is part of a larger project, please include the entire scope of your project, and not just a portion of it. PG&E's facilities are to be incorporated within any CEQA document. PG&E needs to verify that the CEQA document will identify any required future PG&E services.

3. An engineering deposit may be required to review plans for a project depending on the size, scope, and location of the project and as it relates to any rearrangement or new installation of PG&E facilities.

Any proposed uses within the PG&E fee strip and/or easement, may include a California Public Utility Commission (CPUC) Section 851 filing. This requires the CPUC to render approval for a conveyance of rights for specific uses on PG&E's fee strip or easement. PG&E will advise if the necessity to incorporate a CPUC Section 851filing is required.

This letter does not constitute PG&E's consent to use any portion of its easement for any purpose not previously conveyed. PG&E will provide a project specific response as required.

Sincerely,

Plan Review Team
Land Management

Attachment 1 – Gas Facilities

There could be gas transmission pipelines in this area which would be considered critical facilities for PG&E and a high priority subsurface installation under California law. Care must be taken to ensure safety and accessibility. So, please ensure that if PG&E approves work near gas transmission pipelines it is done in adherence with the below stipulations. Additionally, the following link provides additional information regarding legal requirements under California excavation laws: https://www.usanorth811.org/images/pdfs/CA-LAW-2018.pdf

1. Standby Inspection: A PG&E Gas Transmission Standby Inspector must be present during any demolition or construction activity that comes within 10 feet of the gas pipeline. This includes all grading, trenching, substructure depth verifications (potholes), asphalt or concrete demolition/removal, removal of trees, signs, light poles, etc. This inspection can be coordinated through the Underground Service Alert (USA) service at 811. A minimum notice of 48 hours is required. Ensure the USA markings and notifications are maintained throughout the duration of your work.

2. Access: At any time, PG&E may need to access, excavate, and perform work on the gas pipeline. Any construction equipment, materials, or spoils may need to be removed upon notice. Any temporary construction fencing installed within PG&E's easement would also need to be capable of being removed at any time upon notice. Any plans to cut temporary slopes exceeding a 1:4 grade within 10 feet of a gas transmission pipeline need to be approved by PG&E Pipeline Services in writing PRIOR to performing the work.

3. Wheel Loads: To prevent damage to the buried gas pipeline, there are weight limits that must be enforced whenever any equipment gets within 10 feet of traversing the pipe.

Ensure a list of the axle weights of all equipment being used is available for PG&E's Standby Inspector. To confirm the depth of cover, the pipeline may need to be potholed by hand in a few areas.

Due to the complex variability of tracked equipment, vibratory compaction equipment, and cranes, PG&E must evaluate those items on a case-by-case basis prior to use over the gas pipeline (provide a list of any proposed equipment of this type noting model numbers and specific attachments).

No equipment may be set up over the gas pipeline while operating. Ensure crane outriggers are at least 10 feet from the centerline of the gas pipeline. Transport trucks must not be parked over the gas pipeline while being loaded or unloaded.

4. Grading: PG&E requires a minimum of 36 inches of cover over gas pipelines (or existing grade if less) and a maximum of 7 feet of cover at all locations. The graded surface cannot exceed a cross slope of 1:4.

5. Excavating: Any digging within 2 feet of a gas pipeline must be dug by hand. Note that while the minimum clearance is only 12 inches, any excavation work within 24 inches of the edge of a pipeline must be done with hand tools. So to avoid having to dig a trench entirely with hand tools, the edge of the trench must be over 24 inches away. (Doing the math for a 24 inch

wide trench being dug along a 36 inch pipeline, the centerline of the trench would need to be at least 54 inches [24/2 + 24 + 36/2 = 54] away, or be entirely dug by hand.)

Water jetting to assist vacuum excavating must be limited to 1000 psig and directed at a 40° angle to the pipe. All pile driving must be kept a minimum of 3 feet away.

Any plans to expose and support a PG&E gas transmission pipeline across an open excavation need to be approved by PG&E Pipeline Services in writing PRIOR to performing the work.

6. Boring/Trenchless Installations: PG&E Pipeline Services must review and approve all plans to bore across or parallel to (within 10 feet) a gas transmission pipeline. There are stringent criteria to pothole the gas transmission facility at regular intervals for all parallel bore installations.

For bore paths that cross gas transmission pipelines perpendicularly, the pipeline must be potholed a minimum of 2 feet in the horizontal direction of the bore path and a minimum of 12 inches in the vertical direction from the bottom of the pipe with minimum clearances measured from the edge of the pipe in both directions. Standby personnel must watch the locator trace (and every ream pass) the path of the bore as it approaches the pipeline and visually monitor the pothole (with the exposed transmission pipe) as the bore traverses the pipeline to ensure adequate clearance with the pipeline. The pothole width must account for the inaccuracy of the locating equipment.

7. Substructures: All utility crossings of a gas pipeline should be made as close to perpendicular as feasible (90° +/- 15°). All utility lines crossing the gas pipeline must have a minimum of 12 inches of separation from the gas pipeline. Parallel utilities, pole bases, water line ‘kicker blocks’, storm drain inlets, water meters, valves, back pressure devices or other utility substructures are not allowed in the PG&E gas pipeline easement.

If previously retired PG&E facilities are in conflict with proposed substructures, PG&E must verify they are safe prior to removal. This includes verification testing of the contents of the facilities, as well as environmental testing of the coating and internal surfaces. Timelines for PG&E completion of this verification will vary depending on the type and location of facilities in conflict.

8. Structures: No structures are to be built within the PG&E gas pipeline easement. This includes buildings, retaining walls, fences, decks, patios, carports, septic tanks, storage sheds, tanks, loading ramps, or any structure that could limit PG&E’s ability to access its facilities.

9. Fencing: Permanent fencing is not allowed within PG&E easements except for perpendicular crossings which must include a 16 foot wide gate for vehicular access. Gates will be secured with PG&E corporation locks.

10. Landscaping: Landscaping must be designed to allow PG&E to access the pipeline for maintenance and not interfere with pipeline coatings or other cathodic protection systems. No trees, shrubs, brush, vines, and other vegetation may be planted within the easement area. Only those plants, ground covers, grasses, flowers, and low-growing plants that grow unsupported to a maximum of four feet (4’) in height at maturity may be planted within the easement area.

11. Cathodic Protection: PG&E pipelines are protected from corrosion with an “Impressed Current” cathodic protection system. Any proposed facilities, such as metal conduit, pipes, service lines, ground rods, anodes, wires, etc. that might affect the pipeline cathodic protection system must be reviewed and approved by PG&E Corrosion Engineering.

12. Pipeline Marker Signs: PG&E needs to maintain pipeline marker signs for gas transmission pipelines in order to ensure public awareness of the presence of the pipelines. With prior written approval from PG&E Pipeline Services, an existing PG&E pipeline marker sign that is in direct conflict with proposed developments may be temporarily relocated to accommodate construction work. The pipeline marker must be moved back once construction is complete.

13. PG&E is also the provider of distribution facilities throughout many of the areas within the state of California. Therefore, any plans that impact PG&E’s facilities must be reviewed and approved by PG&E to ensure that no impact occurs which may endanger the safe operation of its facilities.

Attachment 2 – Electric Facilities

It is PG&E's policy to permit certain uses on a case by case basis within its electric transmission fee strip(s) and/or easement(s) provided such uses and manner in which they are exercised, will not interfere with PG&E's rights or endanger its facilities. Some examples/restrictions are as follows:

1. Buildings and Other Structures: No buildings or other structures including the foot print and eave of any buildings, swimming pools, wells or similar structures will be permitted within fee strip(s) and/or easement(s) areas. PG&E's transmission easement shall be designated on subdivision/parcel maps as "**RESTRICTED USE AREA – NO BUILDING.**"

2. Grading: Cuts, trenches or excavations may not be made within 25 feet of our towers. Developers must submit grading plans and site development plans (including geotechnical reports if applicable), signed and dated, for PG&E's review. PG&E engineers must review grade changes in the vicinity of our towers. No fills will be allowed which would impair ground-to-conductor clearances. Towers shall not be left on mounds without adequate road access to base of tower or structure.

3. Fences: Walls, fences, and other structures must be installed at locations that do not affect the safe operation of PG&'s facilities. Heavy equipment access to our facilities must be maintained at all times. Metal fences are to be grounded to PG&E specifications. No wall, fence or other like structure is to be installed within 10 feet of tower footings and unrestricted access must be maintained from a tower structure to the nearest street. Walls, fences and other structures proposed along or within the fee strip(s) and/or easement(s) will require PG&E review; submit plans to PG&E Centralized Review Team for review and comment.

4. Landscaping: Vegetation may be allowed; subject to review of plans. On overhead electric transmission fee strip(s) and/or easement(s), trees and shrubs are limited to those varieties that do not exceed 15 feet in height at maturity. PG&E must have access to its facilities at all times, including access by heavy equipment. No planting is to occur within the footprint of the tower legs. Greenbelts are encouraged.

5. Reservoirs, Sumps, Drainage Basins, and Ponds: Prohibited within PG&E's fee strip(s) and/or easement(s) for electric transmission lines.

6. Automobile Parking: Short term parking of movable passenger vehicles and light trucks (pickups, vans, etc.) is allowed. The lighting within these parking areas will need to be reviewed by PG&E; approval will be on a case by case basis. Heavy equipment access to PG&E facilities is to be maintained at all times. Parking is to clear PG&E structures by at least 10 feet. Protection of PG&E facilities from vehicular traffic is to be provided at developer's expense AND to PG&E specifications. Blocked-up vehicles are not allowed. Carports, canopies, or awnings are not allowed.

7. Storage of Flammable, Explosive or Corrosive Materials: There shall be no storage of fuel or combustibles and no fueling of vehicles within PG&E's easement. No trash bins or incinerators are allowed.

8. Streets and Roads: Access to facilities must be maintained at all times. Street lights may be allowed in the fee strip(s) and/or easement(s) but in all cases must be reviewed by PG&E for proper clearance. Roads and utilities should cross the transmission easement as nearly at right angles as possible. Road intersections will not be allowed within the transmission easement.

9. Pipelines: Pipelines may be allowed provided crossings are held to a minimum and to be as nearly perpendicular as possible. Pipelines within 25 feet of PG&E structures require review by PG&E. Sprinklers systems may be allowed; subject to review. Leach fields and septic tanks are not allowed. Construction plans must be submitted to PG&E for review and approval prior to the commencement of any construction.

10. Signs: Signs are not allowed except in rare cases subject to individual review by PG&E.

11. Recreation Areas: Playgrounds, parks, tennis courts, basketball courts, barbecue and light trucks (pickups, vans, etc.) may be allowed; subject to review of plans. Heavy equipment access to PG&E facilities is to be maintained at all times. Parking is to clear PG&E structures by at least 10 feet. Protection of PG&E facilities from vehicular traffic is to be provided at developer's expense AND to PG&E specifications.

12. Construction Activity: Since construction activity will take place near PG&E's overhead electric lines, please be advised it is the contractor's responsibility to be aware of, and observe the minimum clearances for both workers and equipment operating near high voltage electric lines set out in the High-Voltage Electrical Safety Orders of the California Division of Industrial Safety (https://www.dir.ca.gov/Title8/sb5g2.html), as well as any other safety regulations. Contractors shall comply with California Public Utilities Commission General Order 95 (http://www.cpuc.ca.gov/gos/GO95/go_95_startup_page.html) and all other safety rules. No construction may occur within 25 feet of PG&E's towers. All excavation activities may only commence after 811 protocols has been followed.

Contractor shall ensure the protection of PG&E's towers and poles from vehicular damage by (installing protective barriers) Plans for protection barriers must be approved by PG&E prior to construction.

13. PG&E is also the owner of distribution facilities throughout many of the areas within the state of California. Therefore, any plans that impact PG&E's facilities must be reviewed and approved by PG&E to ensure that no impact occurs that may endanger the safe and reliable operation of its facilities.