ADMINISTRATIVE REVIEW DRAFT

INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

FOR THE

TIERRASANTA VILLAS APARTMENTS

915 B Street, Livingston, CA

April 2021

Prepared for:

City of Livingston
1416 C Street
Livingston, CA 95334
209-394-8041

Prepared by:

BaseCamp Environmental, Inc.
802 W. Lodi Avenue
Lodi, CA 95240

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INSERT NOTICE OF INTENT

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LIST OF ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

AB	Assembly Bill
AMI	annual median income
APN	Assessor's Parcel Number
ARB	California Air Resources Board
BMP	Best Management Practice
CalEEMod	California Emissions Estimator Model
CalEnviroScreen	California Communities Environmental Health Screening Tool
CalEPA	California Environmental Protection Agency
Cal Fire	California Department of Forestry and Fire Protection
CALGreen	California Green Building Standards Code
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Data Base
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
dB	decibel
dBA	A-weighted decibel
DTSC	California Department of Toxic Substances Control
EIR	Environmental Impact Report
EPA	U. S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GHG	greenhouse gas
IS/MND	Initial Study/Mitigated Negative Declaration
kWh	kilowatt hours
L_{dn}	Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
LOS	Level of Service
LUSD	Livingston Union School District
MCAG	Merced County Association of Governments
mgd	million gallons per day
MID	Merced Irrigation District
MS4	Municipal Separate Storm Sewer System
MUHSD	Merced Union High School District
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
PM_{10}	particulate matter 10 micrometers or less in diameter

$PM_{2.5}$	particulate matter 2.5 micrometers or less in diameter
ROG	reactive organic gases
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCS	Sustainable Communities Strategy
SJVAPCD	San Joaquin Valley Air Pollution Control District
SR	State Route
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
USFWS	U.S. Fish and Wildlife Service
VMT	vehicle miles traveled

NEGATIVE DECLARATION

A. General Project Information

Project Title:	Tierrasanta Villas
Lead Agency Name and Address:	City of Livingston 1416 C Street Livingston, CA 95334
Contact Person and Phone Number:	Randy Hatch, Contract City Planner 209-394-8041, ext. 123
Project Location:	915 B Street, Livingston, California
Project Sponsor Name and Address:	Visionary Home Builders of California, Inc. 315 N. San Joaquin Street Stockton, CA 95202
General Plan Designation:	SC – Service Commercial
Zoning:	C-3 – Highway Service Commercial
Project Description:	The project proposes the development of an apartment complex with 80 units on a four-acre parcel adjacent to and north of B Street. The units would be in five residential buildings: three would be two stories in height, and the other two would be three stories. The project would also include a community center building for apartment residents. City approval of a General Plan Amendment to High Density Residential and rezoning to R-3 (High Density Residential) would be required, along with a Conditional Use Permit and Site Plan/Design Review.
Surrounding Land Uses and Setting:	The project site is within a vacant area of northwestern Livingston approximately bounded by B Street to the south, SR 99 to the north, and existing residential development to the east. A Livingston Union School District facility is located to the south, and a Sikh temple is located to the southwest. The Hammatt Lateral, a canal owned by the Merced Irrigation District, is west of the project site.

Other Public Agencies Whose Approval is Required:	None
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?	No consultation requested.

B. 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" prior to mitigation, as indicated by the checklist on the following pages.

	Aesthetics		Agriculture/Forestry Resources		Air Quality
✓	Biological Resources	✓	Cultural Resources		Energy
✓	Geology/Soils		Greenhouse Gas Emissions	✓	Hazards/Hazardous Materials
✓	Hydrology/Water Quality		Land Use		Mineral Resources
	Noise		Population/Housing		Public Services
	Recreation	✓	Transportation		Tribal Cultural Resources
✓	Utilities/Service Systems	✓	Wildfire	✓	Mandatory Findings of Significance

C. Lead Agency Determination

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

✓ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier 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.

CITY OF LIVINGSTON

_______________________________________ ____________________

Randy Hatch, Contract City Planner Date
Community Development Department

1.0 INTRODUCTION

1.1 Project Brief

This document is an Initial Study/Mitigated Negative Declaration (IS/MND) for the Tierrasanta Villas project (project) in Livingston, California. The 3.98-acre project site is located at 915 B Street (Figures 1-1 to 1-5). This IS/MND has been prepared in compliance with the requirements of the California Environmental Quality Act (CEQA). For the purposes of CEQA, the City of Livingston (City) is the Lead Agency for the project.

The project applicant proposes to construct an 80-unit residential apartment complex. The complex would consist of six buildings. Two three-story buildings and three two-story buildings would have a total of 48 two-bedroom apartments and 32 three-bedroom apartments, all affordable for low-income households. The complex would also include a one-story community center building for apartment residents with space for staff and leasing offices, a child care facility, and other activities. A total of 142 parking spaces would be provided to serve residents and visitors. Access to the site would be provided from driveways off B Street. The project would connect to existing adjacent City and private utilities. The proposed land uses would require a General Plan Amendment, rezoning, and a Conditional Use Permit approved by the City Council, and Site Plan/Design Review approval by the City.

1.2 Purpose of Initial Study

The California Environmental Quality Act (CEQA) requires that public agencies consider and document the potential environmental effects of the agency's actions that meet CEQA's definition of a "project." Briefly summarized, a "project" is an action that has the potential to result in direct or indirect physical changes in the environment. A project includes the agency's direct activities as well as activities that involve public agency approvals or funding. Guidelines for an agency's implementation of CEQA are found in the CEQA Guidelines (Title 14, Chapter 3 of the California Code of Regulations).

Provided that a project is not exempt from CEQA, the first step in the agency's consideration of its potential environmental effects is the preparation of an Initial Study. The Initial Study evaluates whether the project would involve "significant" environmental effects as defined by CEQA and identifies feasible mitigation measures that would avoid significant effects or reduce them to a level that would be less than significant. If the Initial Study does not identify significant effects, or if it identifies mitigation measures that would reduce all the significant effects of the project to a less-than-significant level, then the agency prepares a Negative Declaration or Mitigated Negative Declaration. If the project would involve significant effects that cannot be readily mitigated, then the agency must prepare an Environmental Impact Report (EIR). The agency may also decide to proceed directly with the preparation of an EIR without preparation of an Initial Study.

The proposed project is a "project" as defined by CEQA and is not exempt from CEQA consideration. The City has determined that the project involves the potential for significant environmental effects and requires preparation of this Initial Study. The Initial Study describes the proposed project and its environmental setting, it discusses the potentially significant environmental effects of the project, and it identifies feasible mitigation measures that would avoid the potentially significant environmental effects of the project or reduce them to a level that would be less than significant. The Initial Study considers the project's potential for significant environmental effects in the following subject areas:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire
- Mandatory Findings of Significance

The Initial Study concluded that the project would have potentially significant environmental effects, but that recommended mitigation measures would reduce all these effects to a level that would be less than significant. As of the distribution of the IS/MND for public review, the applicant has accepted all the recommended mitigation measures. As a result, the City has prepared a Mitigated Negative Declaration and notified the public of the City's intent to adopt the Initial Study/Mitigated Negative Declaration. A copy of the City's Notice of Intent, which indicates the time available for comment, is inside the cover of this document.

1.3 Project Background

The project site is in the southeastern corner of an area of vacant land in northwestern Livingston that is approximately bounded by B Street to the south, State Route (SR) 99 to the north, and existing residential development to the east. The Hammatt Lateral, owned and maintained by the Merced Irrigation District (MID), traverses the eastern portion of this area from northeast to southwest to the west of the site. Another channel traverses the western portion of this area from northwest to southeast, intersecting the Hammatt Lateral just north of B Street. Existing utility poles with attached lines have been placed from south to north through the project site. There are no buildings on the project site or on the larger vacant land area.

Northwestern Livingston has been transitioning from mostly vacant and rural land to an area of combined residential, commercial, and institutional development. This development has been spurred by the completion of the SR 99 freeway bypass and the Winton Parkway interchange. Existing residential development, consisting mainly of apartments, is located east of the project site. The Livingston Union School District (LUSD) administrative offices are south of the project site; Selma Herndon Elementary School is located behind these offices. The Guru Nanak Sikh Temple is to the southwest. West of the project site is vacant land, but commercial development has occurred beyond this land close to the intersection of B Street and Winton Parkway. B Street forms the southern boundary of the project site and is the main roadway in the area. SR 99 is north of the project site, but there is no direct access from the site to SR 99, freeway.

The proposed project is intended to provide multifamily rental units for the City. The Livingston General Plan Housing Element, adopted in 2016, noted that while increased residential development has occurred, the City is faced with the difficult task of balancing the needs of existing residents, including lower-income farmworkers, with those of newer residents. Data show that median rents increased by 11 percent in Livingston from 2009 to 2014. The rising rents reflect a lack of multifamily units and rental units in general. The lack of apartment construction, coupled with the demand for affordable housing, have been factors in the rent increases (City of Livingston 2016). The vacancy rate in Livingston as of 2020 is 3.3%, the lowest among the incorporated cities in Merced County. The average number of persons per household in Livingston is 4.22, which is the highest among the incorporated cities in the County (California Department of Finance 2020).

The Livingston General Plan, adopted in 1999 except for the Housing Element, has designated the project site for Highway Service Commercial use. The zoning for the project site is C-3, Service Commercial. The multifamily residential development as proposed by the project would not be consistent with the existing General Plan designation for the project site, and it is not allowed under the current zoning. The project proposes a General Plan Amendment to High Density Residential and a rezone to R-3, High Density Residential. The proposed general plan amendment and rezoning is consistent with the existing multi-family residential development adjacent to and east of the site.

1.4 Environmental Evaluation Checklist Terminology

The project's potential environmental effects are evaluated in the Environmental Evaluation Checklist shown in Chapter 3.0. The checklist includes a list of environmental considerations against which the project is evaluated. For each question, the City determines whether the project would involve: 1) a Potentially Significant Impact, 2) a Less Than Significant Impact with Mitigation Incorporated, 3) a Less Than Significant Impact, or 4) No Impact.

> A Potentially Significant Impact occurs when there is substantial evidence that the project could involve a substantial adverse change to the physical environment; i.e., that the environmental effect may be significant, and mitigation measures have not been defined that would reduce the impact to a less than significant level. If there are one or more Potentially Significant Impact identified in the Initial Study, an EIR is required.

An environmental effect that is Less Than Significant with Mitigation Incorporated is a Potentially Significant Impact that can be avoided or reduced to a level that is less than significant with the application of mitigation measures.

A Less Than Significant Impact occurs when the project would involve effects on an area of environmental concern, but the project would not involve a substantial adverse change to the physical environment and no mitigation measures are required.

A determination of No Impact is self-explanatory.

Some existing regulatory requirements, established by the City and other agencies with jurisdiction, that are routinely implemented in conjunction with new development function as measures that mitigate environmental impacts. These requirements are described in this IS/MND as a part of the existing regulatory setting, along with how these requirements would tend to reduce or avoid the project's environmental effects.

Where existing regulatory requirements are not adequate to reduce the project's environmental impacts to a level that would be less than significant, this IS/MND describes additional non-regulatory mitigation measures that are needed. These mitigation measures are described in the appropriate technical section of Chapter 3.0 and are summarized in Table 1-1. As of the publication of the Notice of Intent for this project, these measures have been accepted by the project applicant. In all cases for this project, these mitigation measures would avoid potentially significant impacts of the projector reduce them to a level that would be less than significant.

1.4 Summary of Environmental Effects and Mitigation Measures

The pages following the figures contain Table 1-1, Summary of Impacts and Mitigation Measures. The table summarizes the results of the Environmental Checklist Form and associated narrative discussion of the project's potential environmental effects in Chapter 3.0. The potential environmental impacts of the proposed project are summarized in the left-most column of this table. The projected level of significance of each impact without mitigation is indicated in the second column. Mitigation measures proposed to avoid or minimize significant environmental effects are shown in the third column, and the significance of the impact, after mitigation measures are applied, is shown in the fourth column.

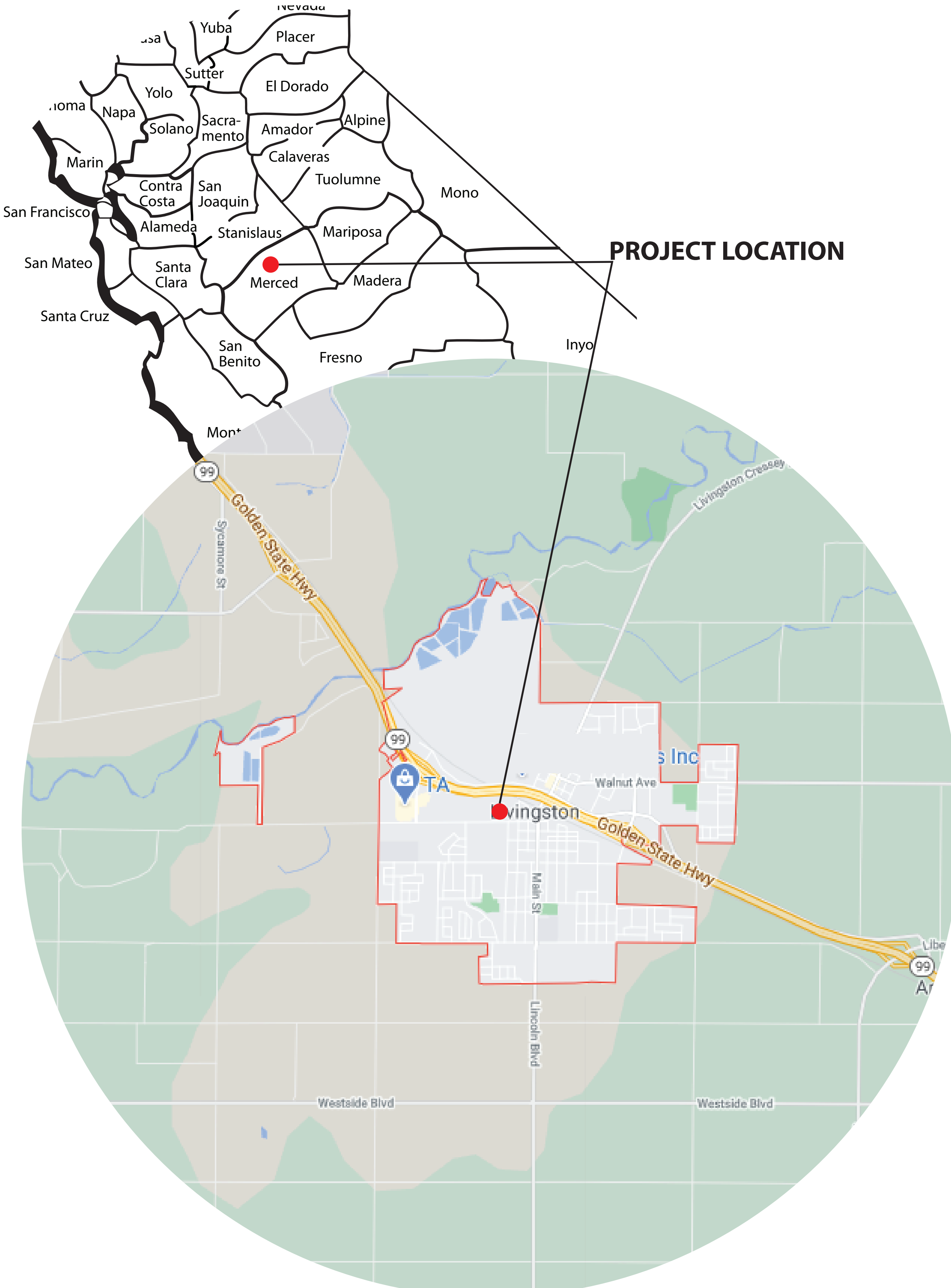

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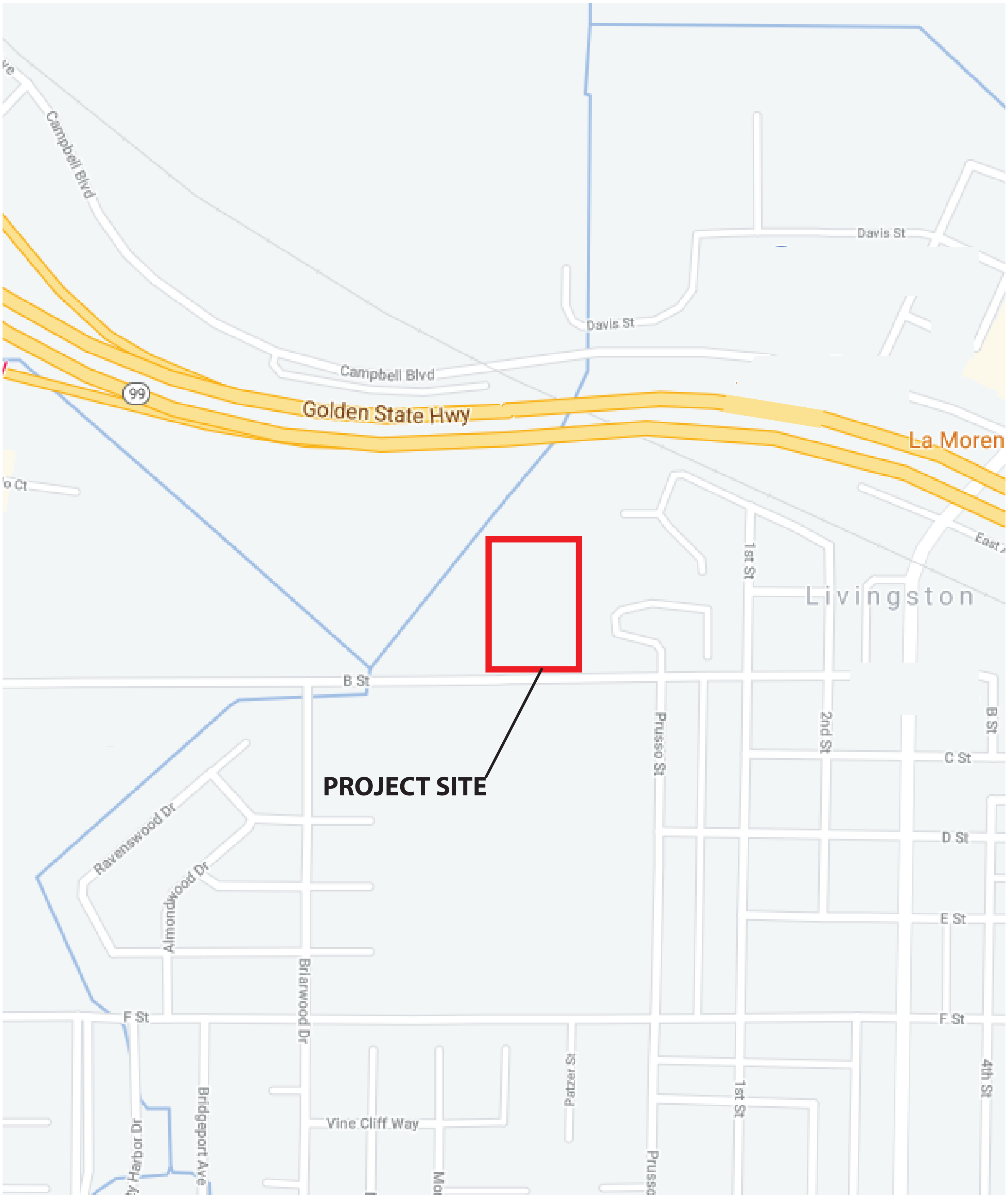
Figure 1-1
REGIONAL LOCATION MAP



SOURCE: Google Maps

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Figure 1-2
STREET MAP

SOURCE: USGS Quadrangle Map, Cressey CA 2018.

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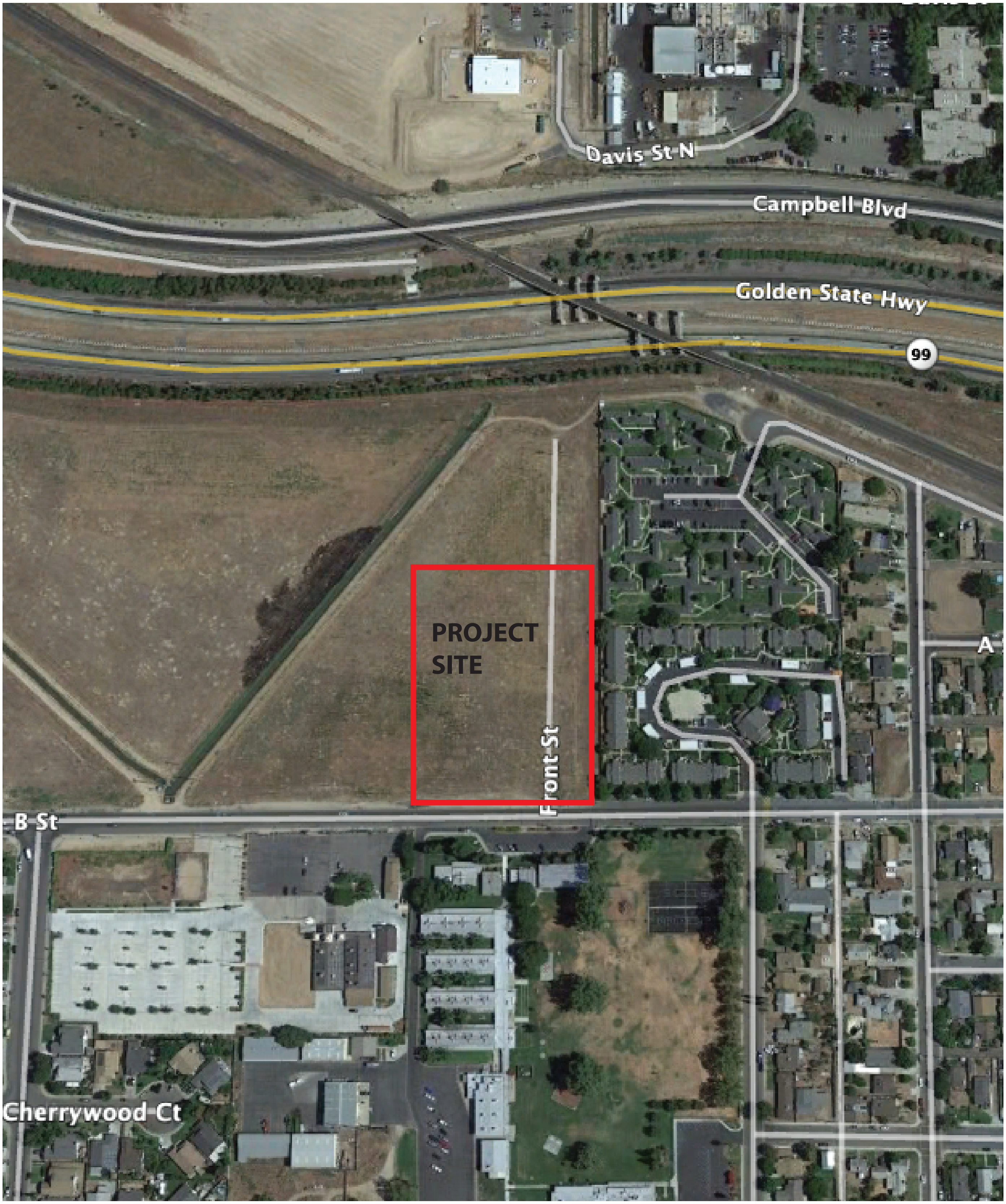
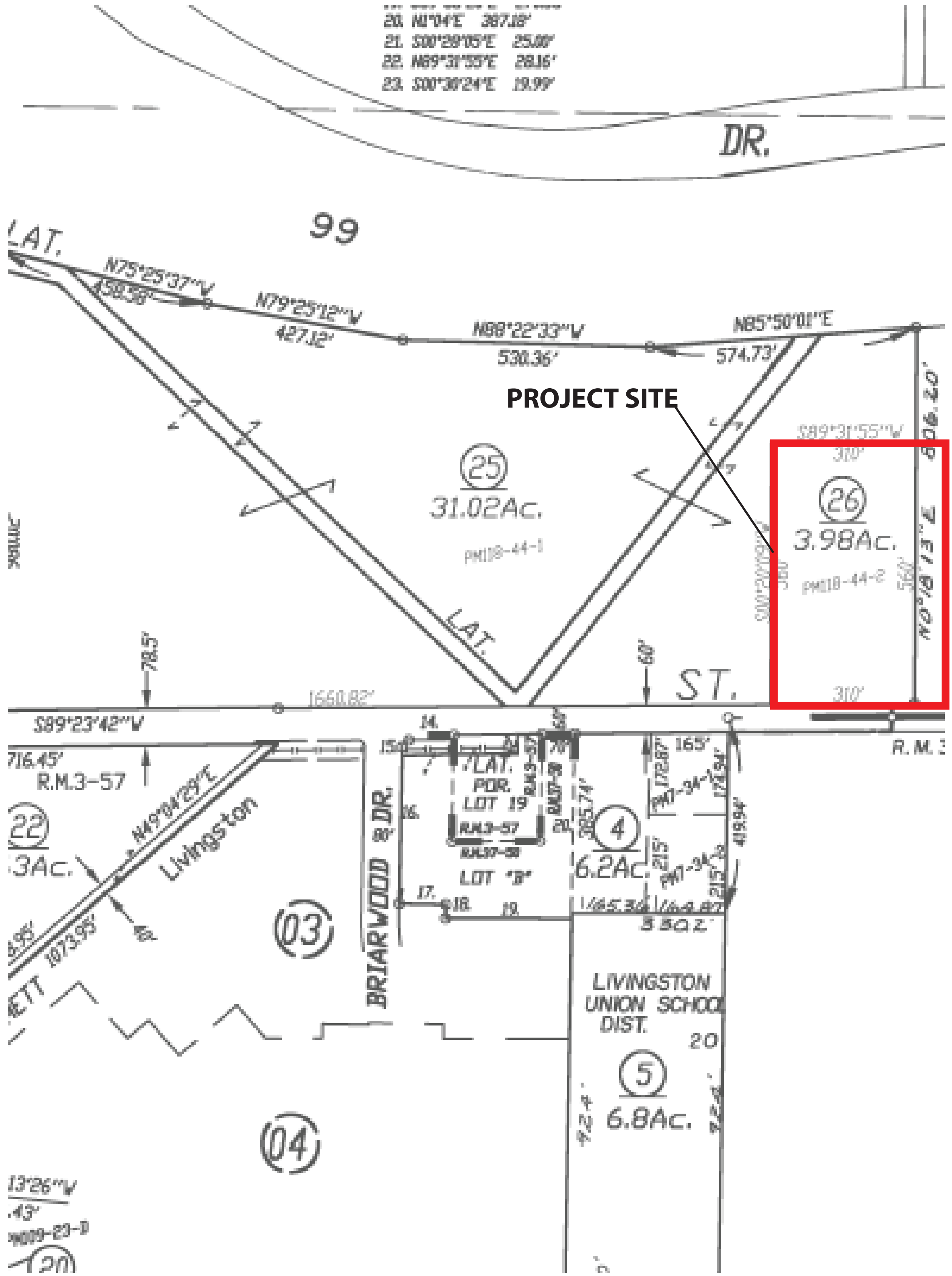
Figure 1-3
USGS MAP



SOURCE: Google Maps

BaseCamp Environmental

Figure 1-4
AERIAL PHOTO



SOURCE: Merced County Assessor Office

BaseCamp Environmental

Figure 1-5
ASSESSOR PARCEL MAP

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.1 AESTHETICS			
a) Scenic Vistas	LS	None required	-
b) Scenic Resources and Highways	NI	None required	-
c) Visual Character and Quality	LS	None required	-
d) Light and Glare	LS	None required	-
3.2 AGRICULTURE AND FORESTRY RESOURCES			
a) Agricultural Land Conversion	NI	None required	-
b) Agricultural Zoning and Williamson Act	NI	None required	-
c, d) Forest Land Conversion and Zoning	NI	None required	-
e) Indirect Conversion of Farmland of Forest Land	NI	None required	-
3.3 AIR QUALITY			
a) Air Quality Plan Consistency	LS	None required	-
b) Cumulative Emissions	LS	None required	-
c) Exposure of Sensitive Receptors to Pollutants	LS	None required	-
d) Odors and Other Emissions	NI	None required	
3.4 BIOLOGICAL RESOURCES			
a) Special-Status Species	LS	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
b) Riparian and Other Sensitive Habitats	NI	None required	-
c) State and Federal Jurisdictional Wetlands	NI	None required	-
d) Fish and Wildlife Movement	PS	BIO-1: If project construction or vegetation removal commences during the general nesting season (March 1 through July 31), a pre-construction survey for all species of nesting birds shall be conducted. If active nests are found, work in the vicinity of the nests shall be delayed until the young have fledged. No surveys need to be taken should project construction or vegetation removal commence outside the general nesting season.	LS
e) Local Biological Requirements	NI	None required	-
f) Conflict with Habitat Conservation Plans	NI	None required	-
3.5 CULTURAL RESOURCES			
a) Historical Resources	NI	None required	-
b) Archaeological Resources	PS	CULT-1: If any subsurface cultural resources are encountered during construction of the project, the City of Livingston Community Development Department shall be notified and all construction activities in the vicinity of the encounter shall be halted until a qualified archaeologist can examine these materials and determine their significance. If the find is determined to be significant, then the archaeologist shall recommend further mitigation measures that would reduce potential effects on the find to a level that is less than significant. Recommended measures may include, but are not limited to, 1) preservation in place, or 2) excavation, recovery, and curation by qualified professionals. The project developer shall be responsible	LS

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
		for retaining qualified professionals, implementing recommended mitigation measures, and documenting mitigation efforts in a written report to the City's Community Development Department, consistent with the requirements of the CEQA Guidelines.	
c) Human Burials	PS	CULT-2: If project construction encounters evidence of human burial or scattered human remains, the contractor shall immediately notify the County Coroner and the City, which shall in turn notify the appropriate tribal representatives. The City shall notify other federal and State agencies as required. The City will be responsible for compliance with the requirements of California Health and Safety Code Section 7050.5 and with any direction provided by the County Coroner. If the human remains are determined to be Native American, the County Coroner shall notify the Native American Heritage Commission, which will notify and appoint a Most Likely Descendant. The Most Likely Descendant shall work with the City and a qualified archaeologist to decide the proper treatment of the human remains and any associated funerary objects in accordance with California Public Resources Code Sections 5097.98 and 5097.991. Avoidance is the preferred means of disposition of the burial resources.	LS
3.6 ENERGY			
a) Project Energy Consumption	LS	None required	-
b) Consistency with Energy Plans.	LS	None required	-
3.7 GEOLOGY AND SOILS			
a-i) Fault Rupture Hazards	NI	None required	-

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Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
a-ii, iii) Seismic Hazards	LS	None required	-
a-iv) Landslides	LS	None required	-
b) Soil Erosion	PS	GEO-1: Prior to commencement of construction activity, the developer shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for the project and file a Notice of Intent (NOI) with the State Water Resources Control Board (SWRCB) in compliance with the Construction General Permit and City of Livingston storm water requirements. The SWPPP shall be available on the construction site at all times. The developer shall incorporate an Erosion Control Plan consistent with all applicable provisions of the SWPPP within the site improvement and building plans. The developer also shall submit the SWRCB Waste Discharger's Identification Number (WDID) to the City prior to approval of development or grading plans.	LS
c) Geologic Instability	LS	None required	-
d) Expansive Soils	NI	None required	-
e) Adequacy of Soils for Wastewater Disposal	NI	None required	-
f) Paleontological Resources and Unique Geological Features	PS	GEO-2: If any subsurface paleontological resources are encountered during construction of the project, the City of Livingston Community Development Department shall be notified and all construction activities in the vicinity of the encounter shall be halted until a qualified paleontologist can examine these materials and determine their significance. If the find is determined to be significant, then the paleontologist shall recommend mitigation measures that would reduce potential effects on the find to a level that is less than significant. Recommended measures may include, but are not limited to, 1) preservation in place, or	LS

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
		2) excavation, recovery, and curation by qualified professionals. The project developer shall be responsible for retaining qualified professionals, implementing recommended mitigation measures, and documenting mitigation efforts in a written report to the City's Community Development Department, consistent with the requirements of the CEQA Guidelines.	
3.8 GREENHOUSE GAS EMISSIONS			
a, b) Project GHG Emissions and Consistency with GHG Reduction Plans	LS	None required	-
3.9 HAZARDS AND HAZARDOUS MATERIALS			
a) Hazardous Material Transport, Use, and Storage	LS	None required	-
b) Release of Hazardous Materials	LS	None required	-
c) Hazardous Materials Releases near Schools	NI	None required	-
d) Hazardous Materials Sites	NI	None required	-
e) Public Airport Operations	NI	None required	-
f) Emergency Response and Evacuations	PS	HAZ-1: Prior to the start of project construction, the developer shall prepare and implement a Traffic Control Plan, which shall include such items as traffic control requirements, resident notification of access closure, and daily access restoration. The contractor shall specify dates and times of road closures or restrictions, if any, and shall ensure that adequate access will be provided for emergency vehicles. The Traffic Control Plan shall be reviewed and approved by the City Department of Public Works and shall be coordinated with the Livingston Police	LS

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
		Department and the Merced County Fire Department if construction will require road closures or lane restrictions.	
g) Wildland Fire Hazards	NI	None required	-
3.10 HYDROLOGY AND WATER QUALITY			
a) Surface Water Quality	PS	HYDRO-1: The developer shall submit a Storm Water Quality Plan for the project that shall include post-construction Best Management Practices (BMPs) as required by the City's Storm Water Management Program. The Storm Water Quality Plan shall be reviewed and approved by the City of Livingston Public Works Department prior to approval of project improvement plans. HYDRO-2: If required, the developer shall execute a Maintenance Agreement with the City for stormwater BMPs prior to receiving a Certificate of Occupancy. The developer shall remain the responsible party and provide funding for the operation, maintenance and replacement costs of the proposed treatment devices built for the project. HYDRO-3: The developer shall comply with applicable requirements of, and pay all associated fees as required by, the City's Storm Water Pollution Prevention Program as set forth in its NPDES Storm Water Permit.	LS
b) Groundwater Supplies and Recharge	LS	None required	-
c-i, ii, iii) Drainage Patterns and Runoff	LS	None required	-
c-iv) Flood Flows	NI	None required	-
d) Other Flooding Hazards	LS	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
e) Conflict with Water Quality or Groundwater Plans	NI	None required	-
3.11 LAND USE AND PLANNING			
a) Division of Established Communities	NI	None required	-
b) Conflicts with Plans, Policies and Regulations Mitigating Environmental Effects	LS	None required	-
3.12 MINERAL RESOURCES			
a, b) Availability of Mineral Resources	NI	None required	-
3.13 NOISE			
a) Exposure to Noise Exceeding Local Standards	LS	None required	-
b) Exposure to Groundborne Vibration or Noise	LS	None required	-
c) Public Airport and Private Airstrip Noise	NI	None required	-
3.14 POPULATION AND HOUSING			
a) Unplanned Population Growth	LS	None required	-
b) Displacement of Housing or People	NI	None required	-
3.15 PUBLIC SERVICES			
a) Fire Protection	LS	None required	-
b) Police Protection	LS	None required	-
c) Schools	LS	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
d, e) Parks and Other Public Facilities	LS	None required	-
3.16 RECREATION			
a, b) Recreational Facilities	LS	None required	-
3.17 TRANSPORTATION			
a) Conflict with Transportation Plans, Ordinances and Policies	LS	None required	-
b) Conflict with CEQA Guidelines Section 15064.3(b)	LS	None required	-
c) Traffic Hazards	PS	TRANS-1: The project applicant shall meet with the City Engineer and City Planner, along with a representative of the Livingston Union School District, to evaluate the need for parking and pedestrian facilities in the vicinity of the project site, such as turn pockets and additional crosswalks. Should it be determined that such additional facilities would be necessary, they shall be made a condition of approval for the project, and the project applicant shall pay fair-share costs for the installation of these facilities. The City shall determine fair-share costs.	LS
d) Emergency Access	LS	None required	-
3.18 TRIBAL CULTURAL RESOURCES			
a, b) Tribal Cultural Resources	NI	None required	-
3.19 UTILITIES AND SERVICE SYSTEMS			
a) Relocation or Construction of New Facilities	PS	Mitigation Measure CULT-1.	LS

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
b) Water Systems and Supply	LS	None required	-
c) Wastewater Treatment Capacity	LS	None required	-
d, e) Solid Waste Services	LS	None required	-
3.20 WILDFIRE			
a) Emergency Response Plans and Emergency Evacuation Plans	PS	Mitigation Measure HAZ-1.	LS
b) Exposure of Project Occupants to Wildfire Hazards	NI	None required	-
c) Installation and Maintenance of Infrastructure	NI	None required	-
d) Risks from Runoff, Post-Fire Slope Instability, or Drainage Changes	NI	None required	-
3.21 MANDATORY FINDINGS OF SIGNIFICANCE			
a) Findings on Biological and Cultural Resources	PS	Mitigation measures in Sections 3.4 and 3.5.	LS
b) Findings on Individually Limited but Cumulatively Considerable Impacts	LS	None required	-
c) Findings on Adverse Effects on Human Beings	LS	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

2.0 PROJECT DESCRIPTION

2.1 Project Location

The project site is located on 915 B Street in northwestern Livingston (see Figures 1-1 to 1-5). The project site is on a parcel identified as Assessor's Parcel Number (APN) 22-010-26. The site is shown on the U.S. Geological Survey's Cressey, California, 7.5-minute quadrangle map as within Section 26, Township 6 South, Range 11 East, Mt. Diablo Base and Meridian. The approximate latitude and longitude of the project site is 37º 23' 12" North and 120º 43' 43" West, respectively.

2.2 Project Details

The project proposes to construct an apartment complex consisting of six buildings on a 3.98-acre undeveloped site in the City of Livingston. Five buildings would have a total of 80 apartment units affordable to lower-income households. The other building would be a community center for apartment residents with space for staff and leasing offices, a child care facility, and other activities. Additional project components include parking spaces, landscaping, and utility improvements. Figure 2-1 shows the project site plan. Table 2-1 below summarizes the proposed project construction.

TABLE 2-1
PROPOSED PROJECT CONSTRUCTION

Building	No. of 2-Bedroom Units	No. of 3-Bedroom Units	Total Floor Area (square feet)
Apartment Buildings			
Building A	8	8	17,000
Building A1 (2)	24	24	51,000
Building B (2)	16	-	15,120
Subtotal	*48*	*32*	*83,120*
Community Center	-	-	7,196
TOTAL	48	32	90,316

Apartment Buildings

The project proposes to construct two three-story apartment buildings, both approximately 39.75 feet in height. Figure 2-2 shows the building elevations for these three-story buildings, labeled as Building A1 on Figure 2-1. Each three-story building would have a total of 24 units: 12 two-bedroom/one-bathroom units approximately 945 square feet in floor area, and 12 three-bedroom/two-bathroom units approximately 1,180 square feet in floor area.

Three two-story apartment buildings would also be constructed. One of these buildings, designated Building A, would have 16 units: 8 two-bedroom/one-bathroom units and 8 three-bedroom/two-bathrooms. Figure 2-3 shows the elevations for this apartment building. The other two buildings, designated as Building B on Figure 2-1, would each have eight units, all two-bedroom/one-bathroom units. Figure 2-4 shows the elevations for these apartment buildings. The two-bedroom and three-bedroom units would have the same floor area as described for the units in the three-story buildings.

The apartment complex overall would have 48 two-bedroom units and 32 three-bedroom units, for a total of 80 units. One of the three-bedroom units would be occupied by an on-site manager. The other units are intended to be offered at a rent affordable to households making 30-50% of the local Area Median Income (AMI). The 30% AMI tier would be eligible for 16 units (9 two-bedroom and 7 three-bedroom). The 40% AMI tier would be eligible for 26 units (16 two-bedroom and 10 three-bedroom). The 50% AMI tier would be eligible for 37 units (23 two-bedroom and 14 three-bedroom).

For all apartment buildings, the upper stories would be accessed by stairs. Buildings A and A1 would have two stairwells; Building B would have one stairwell. All units would have an outdoor balcony/patio area.

Community Center

In the southeastern corner of the project site, a one-story community center for apartment residents would be constructed. Figure 2-5 shows the community center building elevations. The community center would be approximately 20.75 feet in height and would have approximately 7,196 square feet of floor area. Approximately 4,907 square feet of this space would have staff and leasing offices, a community room with a kitchen for events, and a Family Resource Center that includes computer workstations. A covered patio would be adjacent to the community room. The remaining 2,289 square feet would be dedicated as a child care facility for residents. A covered patio adjacent to this facility would serve as a playground area. Storage rooms, restrooms, electrical rooms, and a janitor facility would be available. Behind the community building, in an enclosed area, would be a community patio, an outdoor pool, and a spa.

Other Features

The project proposes the installation of 142 parking spaces, located along the perimeter of the project site. These spaces would be available to residents and visitors. Of these spaces, six would be for disabled drivers, six would be dedicated to electric vehicles, and 12 would be dedicated to “clean air” vehicles as defined by the California Air Resources Board (ARB). Access to the parking areas would be provided by two gate-controlled driveways off B Street. A few parking spaces would be available outside the driveway gates for visitors. A separate gate for public pedestrian access would be provided off B Street in front of the community center building.

The project proposes a community patio space adjacent to and west of the community center, which may include a half-court for basketball. The patio space would be mostly hardscape, although a few trees would be planted. Community open space would be at the center of the complex. The open space would be mostly lawn with some added trees.

Landscaping would be incorporated throughout the project site (Figure 2-6). Plants proposed for use include large shade trees such as deodar cedar and live oak, medium shade trees such as Chinese pistache and zelkova, narrow shade trees such as Princeton sentry gingko, and small accent trees such as crape myrtle and Saratoga laurel. Trees planted along B Street would be those recommended for this location by the City. Plant selections are intended to be drawn from the lowest water-using category to foster a sustainable landscape. Where necessary, continuous root barriers would be installed to protect sidewalk and other flatwork from disruption.

Project Construction

Project construction would include activities such as excavating, grading, steel framing, masonry, installation of infrastructure, paving of parking areas, and landscaping. Types of construction equipment expected to be used at the site include dozers, backhoes, loaders, forklifts, cranes, haul trucks, and graders. It is anticipated that construction would be conducted in three phases. The first phase would be grading, excavation and site preparation, and establishment of utilities. The second phase would consist of construction of the interior and exterior of the buildings, and the third phase would be installation of internal access roads and other hardscape, access gates, perimeter fencing, and landscaping.

Frontage improvements along B Street, including curb, gutter, and sidewalk, would be installed in accordance with City specifications. The project would connect its water system to an existing 12-inch diameter water line beneath B Street at the project frontage. The sanitary sewer system would connect to an existing 27-inch diameter sewer line beneath B Street.

The project proposes two options for the collection and disposal of onsite storm drainage. One option is to construct a storm drainage line in B Street that would convey runoff westward to the existing storm drainage system west of Briarwood Drive. The other option is an onsite French drain retention system. As of this date, no option has been selected, so this IS/MND evaluates the potential environmental impacts of both options.

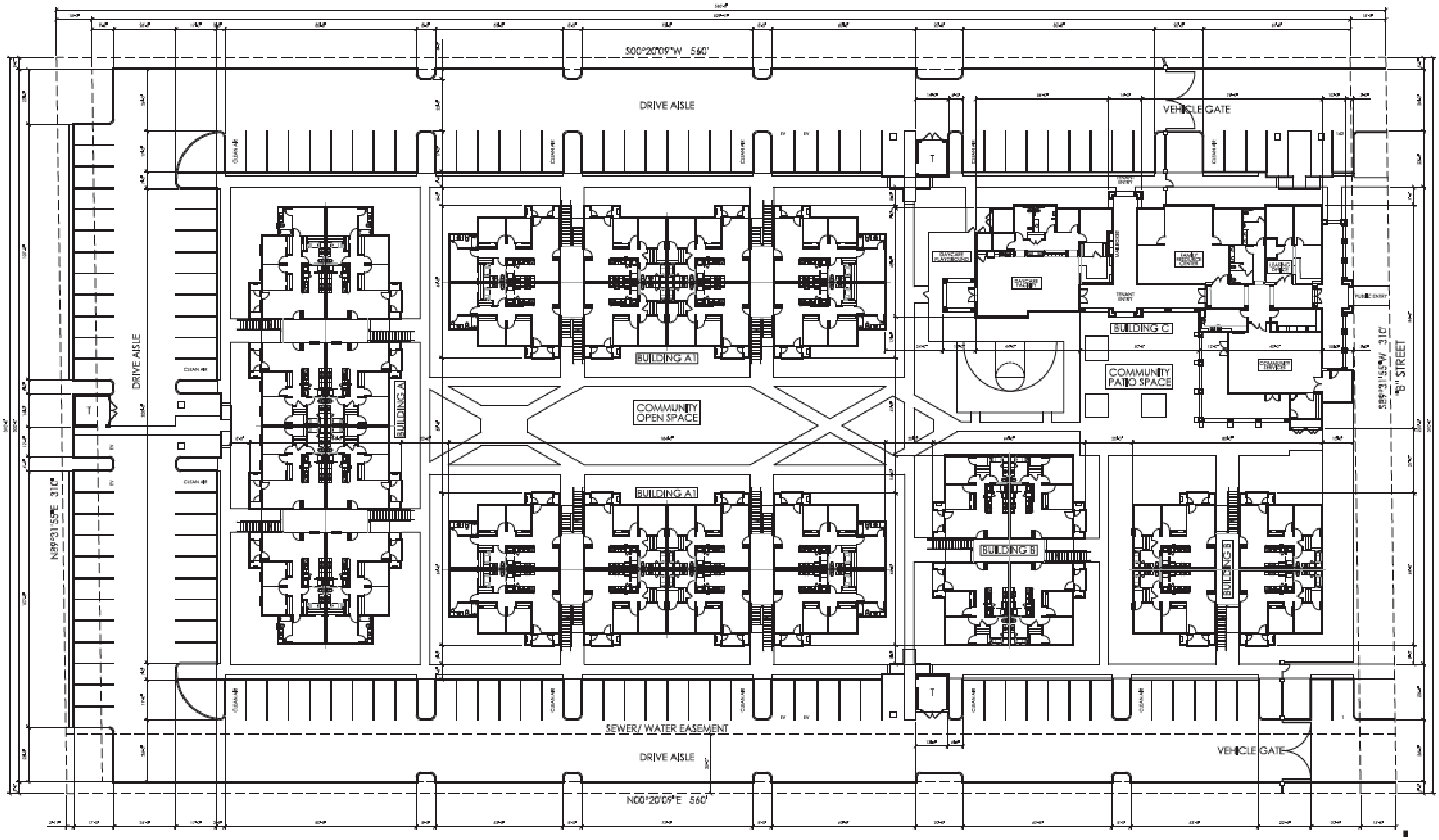
The project would connect to available electric and gas lines adjacent to the project site. The project applicant has indicated that the seller of the property is having its engineer coordinate the relocation, undergrounding, and/or removal of the existing overhead lines running through the project site. While this activity would occur in coordination with the project, it would occur independently from the project, so only limited discussion would be provided in this IS/MND.

2.3 Permits and Approvals

The proposed project is not consistent with the current General Plan designation of Highway Service Commercial nor the current zoning C-3 (Service Commercial). Therefore, the project would require a General Plan Amendment and rezoning of the project site to designations that are consistent with the proposed project. The project proposes to change the General Plan designation of the project site to High Density Residential, and to rezone the site to R-3 (High Density Residential). The Livingston City Council must grant these approvals.

The City requires a project that has more than 25 units or a density of more than 24 units per gross acre to obtain a Conditional Use Permit. Since the project proposes more than 25 units, it must obtain a Conditional Use Permit, which must receive approval of the Livingston Planning Commission.

The project development would require Site Plan/Design Review approval by the City. Should the project be approved by the City, building and grading permits from the City would be required, along with encroachment permit for work in City streets. The landscaping design would be required to conform to the City's Standards of Landscape Design (Chapter 11, 9-11-3) and require City approval prior to issuance of a building permit.



SOURCE: Lee Jagoe Architecture

PRELIMINARY PROJECT DATA

BUILDING DATA				LIVEABLE SQUARE FOOTAGE			
TYPE	STORIES	TOTAL	UNITS	SQ. FT./ FLOOR	TOTAL/ BUILDING	TOTAL/ TYPE	TOTAL
A	2	1	(8) TYPE 1/ (8) TYPE 2	8,500	17,000	17,000	83,120
A1	3	2	(12) TYPE 1/ (12) TYPE 2	8,500	25,500	51,000	
B	2	2	(8) TYPE 1	3,780	7,560	15,120	
C	1	1	COMM CNTR/ LEASING	4,907	4,907	4,907	7,196
			DAYCARE	2,289	2,289	2,289	

UNIT DATA			
TYPE	UNITS	SQ. FT.	TOTAL
1	2 BEDROOM/ 1 BATH	945	48
2	3 BEDROOM/ 2 BATH	1,180	32
TOTAL NUMBER OF UNITS			80

SITE DATA
3.984 ACRES
20.08 U/AC – GROSS

PARKING DATA: PROVIDED		MINIMUM SPACES REQUIRED	
TYPE	TOTAL	80 8 4 6	1/UNIT 1/10 UNITS LEASING/SERVICES DAYCARE
STD 9' x 19'-0" STALLS: TOTAL	142		
ACCESSIBLE (INCLUDED)	6		
CLEAN AIR (INCLUDED)	12	98	TOTAL
EV CHARGING (INCLUDED)	6	VERIFY ACCESSIBLE/ C.A/ EV STALLS	

BaseCamp Environmental

Figure 2-1
SITE PLAN

BUILDING TYPE A1: FRONT/REAR ELEVATION

BUILDING TYPE A1: SIDE ELEVATION

COLOR SCHEME

MAIN STUCCO COLOR #1: SUMMER HILL [illegible]	ACCENT STUCCO COLOR #3: RITZY [illegible]
MAIN STUCCO COLOR #2: SWISS COFFEE 23	STONE: COLOR: PIONEER El DORADO STONE MOUNTAIN LEDGE
ACCENT STUCCO COLOR #1: ROASTED KONA KMA69	ROOF: COLOR: AGED BARK CERTAINTEED PRESIDENTIAL SHAKE
ACCENT STUCCO COLOR #2: TEXAS HEATWAVE KM5421	

VHB

BUILDING A1 - 3 STORY
TIERRASANTA VILLAS
LIVINGSTON, CA

Scale 1/8"=1'-0"
November 10, 2020

A7

LEE • JAGOE ARCHITECTURE
INCORPORATED

BaseCamp Environmental

Figure 2-2
BUILDING A1 FRONT/ REAR AND SIDE ELEVATIONS

BUILDING TYPE A: FRONT/REAR ELEVATION

BUILDING TYPE A: SIDE ELEVATION

COLOR SCHEME

MAIN STUCCO COLOR #1: SUMMER HILL KM5700	ACCENT STUCCO COLOR #3: RITZY HLS4242
MAIN STUCCO COLOR #2: SWISS COFFEE 23	STONE: COLOR: PIONEER EL DORADO STONE MOUNTAIN LEDGE
ACCENT STUCCO COLOR #1: ROASTED KONA KMA69	ROOF: COLOR: AGED BARK CERTAINTEED PRESIDENTIAL SHAKE
ACCENT STUCCO COLOR #2: TEXAS HEATWAVE KM5421	

VHB

BUILDING A - 2 STORY
TIERRASANTA VILLAS
LIVINGSTON, CA

Scale 1/8"=1'-0"
November 10, 2020

A4

LEE + JAGOE ARCHITECTURE
INCORPORATED

BaseCamp Environmental

Figure 2-3
BUILDING A FRONT/REAR AND SIDE ELEVATIONS

COLOR SCHEME

MAIN STUCCO COLOR #1: SUMMER HILL RMS700	ACCENT STUCCO COLOR #3: RITZY HLS4242
MAIN STUCCO COLOR #2: SWISS COFFEE 23	STONE: COLOR: PIONEER EL DORADO STONE MOUNTAIN LEDGE
ACCENT STUCCO COLOR #1: ROASTED KONA RMA69	ROOF: COLOR: AGED BARK CERTAINTEED PRESIDENTIAL SHAKE
ACCENT STUCCO COLOR #2: TEXAS HEATWAVE RMS421	

VHB

BUILDING B - 2 STORY

TIERRASANTA VILLAS

LIVINGSTON, CA

Scale 3/16"=1'-0"
November 10, 2020

A9

LEE-JAGOE ARCHITECTURE
INCORPORATED

BaseCamp Environmental

Figure 2-4
BUILDING B FRONT AND SIDE ELEVATIONS

COLOR SCHEME

MAIN STUCCO COLOR #1: SUMMER HILL KM5700	ACCENT STUCCO COLOR #3: RITZY HLS4242
MAIN STUCCO COLOR #2: SWISS COFFEE 23	STONE: COLOR: PIONEER EL DORADO STONE MOUNTAIN LEDGE
ACCENT STUCCO COLOR #1: ROASTED KONA KMA69	ROOF: COLOR: AGED BARK CERTAINTEED PRESIDENTIAL SHAKE
ACCENT STUCCO COLOR #2: TEXAS HEATWAVE KM5421	

VHB

BUILDING C - 1 STORY
TIERRASANTA VILLAS
LIVINGSTON, CA

Scale 1/8"=1'-0"
November 10, 2020

A12

LEE-JAGOE ARCHITECTURE INCORPORATED

BaseCamp Environmental

Figure 2-5
COMMUNITY CENTER BUILDING FRONT/REAR AND SIDE ELEVATIONS

BaseCamp Environmental

Figure 2-6
LANDSCAPE PLAN

3.0 ENVIRONMENTAL CHECKLIST FORM

3.1 AESTHETICS

Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage points.) 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 which would adversely affect daytime or nighttime views in the area?			✓	

NARRATIVE DISCUSSION

Environmental Setting

The project site is in a developing area of western Livingston, with intermixed vacant land and urban development. The site itself is a vacant parcel containing grasses and weeds. The only notable visual feature is a line of utility poles with attached lines that traverse the project site in a north-south orientation. The MID Hammatt Lateral passes west of the project site.

Views east of the project site are of residential development, mainly other apartment buildings. Views to the south are dominated by the LUSD facilities and the Sikh temple (see Chapter 1.0, Introduction). Views to the west are of vacant land, with commercial buildings visible in the distance. The north views consist of vacant land and SR 99.

California's Scenic Highway Program (California Streets and Highways Code Section 260 *et seq*.) was created in 1963 to preserve and protect scenic highway corridors from change which would diminish the aesthetic value of lands adjacent to highways. The program includes a list of highways that are either eligible for designation as scenic highways or have been so designated. There are only two officially designated State Scenic Highway within Merced County: Interstate 5 from the Stanislaus County Line to State Route (SR) 152 (14.9 miles), and SR 152 from Interstate 5 to the Santa Clara County Line (13.8 miles). Both are in western Merced County (Caltrans 2018).

There are no lighting features on the project site. Existing lighting in the immediate project vicinity consists mainly of security and building lighting in nearby development. There is limited street lighting along B Street.

Livingston Municipal Code Section 5-4-4 sets standards for landscaping. Landscaping shall be in scale with adjacent buildings and be of appropriate size at maturity to accomplish its intended purpose. Portions of a site not utilized for structures, parking, circulation, storage or other uses, shall be landscaped. Parking lots shall incorporate landscaping for all areas not used for vehicle storage, access, or circulation.

Livingston Municipal Code Section 5-6-7 requires all new development within the R-2 and R-3 zones to apply for Site Plan and Design Review. The purpose of this review is to permit the City to evaluate site plans and designs of new and existing structures to assure compatibility, harmony in appearance in neighborhoods, reduction of negative impacts of non-aesthetic development, and orderly development of the community. The City Council is the approving body for the Design Review process, with City Planning Commission recommendation. While the project site is currently zoned C-3, the project proposes to rezone the site to R-3, so Livingston Municipal Code Section 5-6-7 would apply.

The City has adopted the Design Guide for Development. The Design Guide is intended to address the physical design of development for both single-family and multifamily residential uses, including site planning, architecture, use of open spaces, lot configurations, circulation, and similar issues. The Design Guide serves as a reference for use by City Staff, the Planning Commission, and the City Council, as well as the development community during the design review process.

The recently revised Appendix G of the CEQA Guidelines mentions California Public Resources Code Section 21099, which states that the aesthetic and parking impacts of residential, mixed-use residential, or employment center projects on an infill site within a transit priority area shall not be considered significant effects under CEQA. While the project is residential and may be considered an infill project, it is not in a designated transit priority area. Therefore, Public Resources Code Section 21099 does not apply to this project.

Environmental Impacts and Mitigation Measures

a) Scenic Vistas.

The Merced County General Plan notes that scenic vistas in the County, where available, include views of the Coast Ranges to the west, the Sierra Nevada to the east, and the corridors of the Merced River, San Joaquin River, Los Banos Creek, and Bear Creek (Merced County 2013a). Because of existing development surrounding the site, these visual points of interest are not visible from the project site.

The project involves the construction of a high-density residential development, a community center, and related site improvements. These structures have the potential to partially obstruct contribute to obstruction of distance views, but given their location and existing obstruction, they would not involve a significant effect on views of mountain ranges to the west and east. Project impacts on scenic vistas would be less than significant.

b) Scenic Resources and Highways.

The project site is a vacant parcel covered with grasses and weeds. No trees, rock outcroppings, or other notable scenic features are on the site. The project site is not on or near the stream corridors designated by the County General Plan as scenic areas. It is not near any of the designated State Scenic Highways,. No scenic highways have been designated by either the City or Merced County. The project would have no impact on scenic resources and highways.

c) Visual Character and Quality.

As noted, the project site is a vacant parcel covered with grasses and weeds, with utility poles the most notable visual feature. The project, with its design and landscaping, may be considered an improvement to on-site aesthetics as viewed from B Street, which is the main public viewing area in the vicinity. Project buildings would be constructed in a hacienda Mediterranean architectural style, and the three-story buildings are set farther back from B Street to minimize massing along the street frontage.

As the project is a new development on a site proposed for rezoning as R-3, it would be subject to Site Plan and Design Review by the City, which is intended to promote harmony in appearance in neighborhoods and to reduce negative aesthetic impacts. The project also would be required to comply with applicable landscaping standards, as specified in the City's Zoning Ordinance. Project impacts on visual quality would be less than significant.

d) Light and Glare.

The project would add lighting to a site that currently has no lighting. Proposed lighting would be similar to lighting in the adjacent multifamily residential development to the east. Project lighting could result in changes in indirect illumination levels to residential units adjacent to the project site.

The project would implement a Lighting Plan that would be consistent with California's 2019 Building Energy Efficiency Standards, Title 24, Part 6, which includes lighting controls such as the use of light-emitting diode fixtures, time switches, and motion sensors for all exterior lighting. Pole-mounted light fixtures would be appropriately angled to minimize light exposure.

The City's Site Plan and Design Review requires a project to identify potentially reflective exterior building materials and their location in relation to motorists and other persons within sight of the project. Also, site plans must identify any exterior light sources and areas subject to potential offsite illumination areas. Potential offsite lighting impacts would be considered during City site plan review, which may lead to the imposition of additional mitigation measures as conditions of approval. The Conditional Use Permit would also likely have lighting requirements as part of its conditions of approval. Project impacts on light and glare would be less than significant.

3.2 AGRICULTURE AND FORESTRY RESOURCES

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 non-agricultural 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 non-agricultural use, or conversion of forest land to non-forest use?				✓

NARRATIVE DISCUSSION

Environmental Setting

A Central California Information Center report indicates that the project site had been used historically for row crop production (CCIC 2021). However, based on historical Google Earth imagery, the project site does not appear to have been used for agriculture for more than two decades. The site is currently zoned for service commercial (C-3) development. Surrounding lands, as noted, include residential and institutional uses and vacant land. The vacant land to the west also appears to have not been used for agriculture for more than two decades.

The Important Farmland Maps, prepared by the California Department of Conservation as part of its Farmland Mapping and Monitoring Program, designate the viability of lands for farmland use, based on the physical and chemical properties of the soils and other factors. The maps categorize farmland, in decreasing order of soil quality, as "Prime Farmland," "Unique Farmland," and "Farmland of Statewide Importance." Collectively, these categories are referred to as "Farmland" in the CEQA Checklist in Appendix G of the CEQA Guidelines and in this document. There are also designations for grazing land and for urban/built-up areas, among others. According to the 2016 Important Farmland Map of Merced County, the most recent map available, the project site contains land designated as Farmland of Local Importance (California Department of Conservation 2018), which is not considered important "Farmland" under CEQA.

Environmental Impacts and Mitigation Measures

a) Farmland Conversion.

The project site is designated as Farmland of Local Importance by the Farmland Mapping and Monitoring Program. This designation does not meet the CEQA Guidelines Appendix G definition of Farmland; therefore, the project would not convert Farmland to non-agricultural use. The project would have no impact on Farmland conversion.

b) Agricultural Zoning and Williamson Act.

As previously noted, the project site is zoned for commercial uses, not for agriculture. The Williamson Act is State legislation that seeks to preserve farmland by offering property tax breaks to farmers who sign a contract pledging to keep their land in agricultural use. The project site is not under a Williamson Act contract. The project would have no impact on this issue.

c, d) Forest Land Conversion and Zoning.

The Merced County General Plan EIR states that the County has no large forests and no commercial forestry production (Merced County 2013b). There are no designated forest lands on the project site or in the vicinity, and the project site is not zoned for timber production. The project would have no impact on forest lands.

e) Indirect Conversion of Farmland and Forest Land.

Vacant lands in the vicinity of the project site contain Farmland of Local Importance, which as noted is not Farmland as defined for CEQA purposes. No active agricultural operations are on these lands. All these vacant lands have been designated and zoned for urban development, and urban infrastructure has been extended to the area. Other lands in the vicinity have been developed for urban uses. As noted in c, d) above, there are no forest lands in the vicinity. The project would have no impact related to indirect conversion of Farmland or forest land.

3.3 AIR QUALITY

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 Attainment Plan?			✓	
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			✓	
c) Expose sensitive receptors to substantial pollutant concentrations?			✓	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?				✓

NARRATIVE DISCUSSION

Environmental Setting

Air Quality Status

The project site is within the San Joaquin Valley Air Basin. The San Joaquin Valley Air Pollution Control District (SJVAPCD), which includes Merced County, has jurisdiction over most air quality matters in the Air Basin. The SJVAPCD is tasked with implementing programs and regulations required by both the federal and California Clean Air Acts. Under their respective Clean Air Acts, both the federal government and the State of California have established ambient air quality standards for six criteria air pollutants: ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. California has four additional criteria pollutants under its Clean Air Act.

Table 3-1 shows the current attainment status of the Air Basin relative to the federal and State ambient air quality standards for criteria pollutants. Except for ozone and particulate matter, which are discussed below, the Air Basin is in attainment of, or unclassified for, all federal and State ambient air quality standards.

Air Pollutants of Concern

The San Joaquin Valley Air Basin is designated a non-attainment area for ozone. Ozone is not emitted directly into the air. It is formed when reactive organic gases (ROG) and nitrogen oxides (NO_X), referred to as “ozone precursors,” react in the atmosphere in the presence of sunlight. Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. The SJVAPCD currently has a 2007 Ozone Plan and a 2013 Plan for the

Revoked 1-Hour Ozone Standard for the Air Basin to attain federal ambient air quality standards for ozone.

The Air Basin is also designated a non-attainment area for respirable particulate matter, a mixture of solid and liquid particles suspended in air, including dust, pollen, soot, smoke, and liquid droplets. In San Joaquin County, particulate matter is generated by a mix of rural and urban sources, including agricultural activities, industrial emissions, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere.

TABLE 3-1
SAN JOAQUIN VALLEY AIR BASIN ATTAINMENT STATUS

	Designation/Classification	
Criteria Pollutant	**Federal Primary Standards**	**State Standards**
Ozone - One hour	No Federal Standard	Nonattainment/Severe
Ozone - Eight hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide (NO_x)	Attainment/Unclassified	Attainment
Sulfur Dioxide (SO_x)	Attainment/Unclassified	Attainment
Lead	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Source: SJVAPCD 2021.

Health concerns associated with suspended particulate matter focus on those particles small enough to reach the lungs when inhaled; consequently, both the federal and state air quality standards for particulate matter apply to particulates 10 micrometers or less in diameter (PM_{10}) and to particulates less than 2.5 micrometers in diameter ($PM_{2.5}$), which are carried deeper into the lungs. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, coughing, bronchitis, and respiratory illnesses in children. The SJVAPCD currently has a 2007 PM_{10} Maintenance Plan to maintain the Air Basin's attainment status for federal PM_{10} ambient air quality standards, and a 2008 $PM_{2.5}$ Plan for the Air Basin to attain federal $PM_{2.5}$ ambient air quality standards.

Carbon monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air, unlike ozone. The main source of CO in the San Joaquin Valley is on-road motor vehicles (SJVAPCD 2015). The

San Joaquin Valley Air Basin is in attainment/unclassified status for CO; as such, the SJVAPCD has no CO attainment plans. High CO concentrations may occur in areas of limited geographic size, referred to as "hot spots," which are ordinarily associated with areas of highly congested traffic.

In addition to the criteria pollutants, the ARB has identified other air pollutants as toxic air contaminants (TACs) - pollutants that may cause acute or chronic long-term health effects, such as cancer. Some TACs may cause adverse effects even at low levels. Diesel particulate matter is the most common TAC, generated mainly as a product of combustion in diesel engines. Other TACs are less common and are typically associated with industrial activities.

Air Quality Rules and Regulations

As previously noted, the SJVAPCD has jurisdiction over most air quality matters in the Air Basin. It implements the federal and California Clean Air Acts, and the applicable attainment and maintenance plans, through local regulations. The SJVAPCD has developed plans to attain State and federal standards for ozone and particulate matter, which include emissions inventories to measure the sources of air pollutants and the use of computer modeling to estimate future levels of pollution and make sure that the Valley will meet air quality goals (SJVAPCD 2015). A State Implementation Plan for CO has been adopted by the ARB for the entire state. The SJVAPCD regulations that would be applicable to the project are summarized below.

Regulation VIII (Fugitive Dust PM10 Prohibitions)

Rules 8011-8081 are designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, landfill operations, etc.

Rule 4101 (Visible Emissions)

This rule prohibits emissions of visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants.

Rule 9510 (Indirect Source Review)

Rule 9510, also known as the Indirect Source Rule, is intended to reduce or mitigate emissions of NO_x and PM_{10} from new development in the SJVAPCD including construction and operational emissions. This rule requires specific percentage reductions in estimated on-site construction and operation emissions, and/or payment of offsite mitigation fees for required reductions that cannot be met on the project site. Construction emissions of NO_x and PM_{10} exhaust must be reduced by 20% and 45%, respectively. Operational emissions of NO_x and PM_{10} must be reduced by 33.3% and 50%, respectively. Rule 9510 applies to residential development projects of 50 units or more. Based on this criterion, the project would be subject to Rule 9510.

Environmental Impacts and Mitigation Measures

In 2015, the SJVAPCD adopted a revised Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD Guide). The SJVAPCD Guide defines an analysis methodology, thresholds of significance, and mitigation measures for the assessment of air quality impacts for projects within SJVAPCD's jurisdiction. Table 3-2 shows the CEQA thresholds for significance for pollutant emissions within the SJVAPCD. The significance thresholds apply to emissions from both project construction and project operations.

The California Emissions Estimator Model (CalEEMod) was used to estimate both construction and operational emissions from the proposed project. The CalEEMod results are shown in Appendix A of this document. Table 3-2 shows the maximum project construction emissions in a calendar year and the annual operational emissions. The construction period is assumed to be part of two calendar years. "Mitigated emissions" are the result of the application of project features that reduce air pollutant and greenhouse gas (GHG) emissions associated with the project. Section 3.8, Greenhouse Gas Emissions, discusses these project features in more detail.

TABLE 3-2
SJVAPCD SIGNIFICANCE THRESHOLDS AND PROJECT EMISSIONS

	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
SJVAPCD Significance Thresholds[1]	**10**	**10**	**100**	**27**	**15**	**15**
Construction Emissions[2]	0.28	0.78	0.86	<0.01	0.08	0.05
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Operational Emissions[3]	0.36	0.06	0.62	<0.01	0.29	0.08
Above Threshold?	*No*	*No*	*No*	*No*	*No*	*No*

[1] Applicable to both construction and operational emissions.
[2] Maximum emissions in a calendar year.
[3] Tons per year under mitigated conditions (see Chapter 9.0, Greenhouse Gas Emissions).
Notes: ROG – reactive organic gases; NO_x – nitrogen oxide; CO – carbon monoxide; SO_x – sulfur oxide; PM_{10} – particulate matter 10 microns in diameter; $PM_{2.5}$ – particulate matter 2.5 microns in diameter.
Sources: CalEEMod Version 2016.3.2, SJVAPCD 2015a.

a) Air Quality Plan Consistency.

SJVAPCD has attainment plans for ozone and particulate matter, while the State has a CO attainment plan. As indicated in Table 3-2, project construction and operational emissions would not exceed the applicable SJVAPCD significance thresholds. The project would be subject to SJVAPCD Rule 9510, which requires NO_x and PM_{10} reductions from construction exhaust and operational emissions for project required to comply with the rule. With application of Rule 9510, project NO_x and PM_{10} construction and operational emissions would be further reduced. Since all project emissions are estimated to be below their respective SJVAPCD significance thresholds, the project would be consistent with adopted reduction plans for ozone, particulate matter, and CO. Project impacts related to air quality plans would be less than significant.

b) Cumulative Emissions.

As described above, the project would not generate operational emissions above SJVAPCD significance thresholds. Application of Rule 9510 would further reduce NO_x and PM_{10} operational emissions. The significance thresholds are applied to evaluate regional impacts of project-specific emissions of air pollutants. Regional impacts of a project can be characterized in terms of total annual emissions of criteria pollutants and their impact on SJVAPCD's ability to reach attainment of criteria pollutant standards. On that basis, the proposed project would not result in a considerable contribution to a significant cumulative air quality impact in the Air Basin. Project impacts related to cumulative emissions would be less than significant.

c) Exposure of Sensitive Receptors to Pollutants.

As defined in the SJVAPCD Guide, sensitive receptors include residences, schools, parks and playgrounds, day care centers, nursing homes, and hospitals (SJVAPCD 2015). The project site is adjacent to and west of a residential complex. As noted, project construction and operational emissions would be below SJVAPCD significance thresholds for criteria pollutants. Implementation of applicable SJVAPCD rules and regulations, especially Regulation VIII and Rule 9510, would further reduce the emissions that could potentially reach the residential area.

CO hotspots have the potential to expose receptors to emissions that violate state and/or federal CO standards, even if the broader air basin is in attainment of these standards. The SJVAPCD guide indicates that a project would create no violations of the CO standards if neither of the following criteria are met (SJVAPCD 2015):

- A traffic study for the project indicates that the Level of Service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or
- A traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at one or more intersections in the project vicinity (See Section 3.17, Transportation, for an explanation of LOS).

As discussed in Section 3.17, Transportation, three intersections that would be potentially affected by the project would operate at LOS F under at least one peak-hour condition. However, these intersections would operate at the same conditions without the project, and with the implementation of recommended improvements identified by the traffic study, these intersections would operate at better than LOS E. Therefore, the project would have no adverse impact related to CO emissions.

As noted, diesel particulate matter is the most common TAC encountered. The main source of diesel particulate matter in the vicinity of the project site is diesel-fueled vehicles on B Street and SR 99. Diesel-fueled vehicles on B Street generally are limited to small commercial trucks. More and larger diesel trucks use SR 99. The ARB recommends that sensitive land uses, including residential areas, not be placed within 500 feet of a freeway. California freeway studies show about a 70% dropoff in particulate pollution levels at 500 feet (ARB 2005). The northernmost proposed residential buildings on the project site are set back from the southern edge of SR 99 by approximately 450 feet, which does not meet the recommended ARB setback.

However, since 2005, when the setback recommendation was made, the ARB has implemented regulations on diesel particulate matter emissions from trucks and buses, the two main sources of diesel particulate matter associated with SR 99. All regulated vehicles must implement Best Available Control Technology to reduce diesel particulate matter emissions by 2023. This and other regulations have reduced diesel particulate matter emissions by 78% from 1990 levels as of 2014 (Schwarzman et al. 2021). Also, the ARB in 2020 adopted the Advanced Clean Trucks regulation, which requires manufacturers to sell an increasing percentage of zero-emission trucks by 2035, and the Advanced Clean Fleets regulation, with the goal of achieving a statewide zero-emission truck and bus fleet by 2045.

With implementation of these regulations, diesel particulate matter emissions have been and would be substantially reduced, thereby making such emissions unlikely to reach residential units at a concentration that could cause health concerns. The potential exposure of sensitive receptors to pollutant emissions would be less than significant.

e) Odors and Other Emissions.

Residential development does not generate substantial odors that would affect nearby land uses, nor would it generate substantial amounts of any other emissions such as TACs. The project would have no impact related to odors or other emissions.

3.4 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 Game 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, or 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 Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?				✓

NARRATIVE DISCUSSION

Environmental Setting

Existing Vegetation and Wildlife

The project area is on a flat landscape that contains sandy soil. Vegetation consists of grasses and weeds. There are no trees or shrubs on the project site. The project site appears to have been mowed.

The City General Plan states that the natural vegetation of the Livingston area historically consisted of vast stretches of savanna traversed by riparian stands of the Merced River and its tributaries. The range of natural vegetation communities has been significantly reduced by conversion of these lands to urban and agricultural uses. The reduction of natural vegetation communities has also reduced the amount of suitable habitat for plant and wildlife species. According to the City General Plan, some migratory birds do pass through the Livingston area, but Livingston is not a year-round or seasonal habitat for migratory birds.

Special-Status Species

Special-status species are plant or wildlife species that are in one or more of the following categories:

- Legally protected under the federal Endangered Species Act, the California Endangered Species Act, or other regulations.
- Designated rare, threatened, or endangered and candidate species for listing by the U.S. Fish and Wildlife Service (USFWS).
- Considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitat.

- Considered rare or endangered under the conditions of CEQA Guidelines Section 15380, such as species identified on Lists 1A, 1B and 2 in the Inventory of Rare and Endangered Vascular Plants of California by the California Native Plant Society, and species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those included on List 3 in the California Native Plant Society Inventory.

Table 3-3 lists the special-status species that have been documented or could potentially occur in the greater project vicinity, along with their listing status and habitat requirements. This table also includes an assessment of the likelihood of occurrence of each of these species in the site. The table is based upon searches of the California Natural Diversity Database (CNDDB) maintained by the California Department of Fish and Wildlife (CDFW) and a report from the IPaC database maintained by the USFWS, which are available in Appendix B. Only two special-status plant species were identified: succulent owl's clover and San Joaquin Valley Orcutt grass. Special-status wildlife species included four birds, five fish, six reptiles and amphibians, three invertebrates, and one mammal (San Joaquin kit fox).

Waters of the U.S. and Wetlands

Waters of the U.S., including wetlands, are broadly defined under 33 Code of Federal Regulations 328 to include navigable waterways, their tributaries, and adjacent wetlands. Jurisdictional wetlands and Waters of the U.S. include, but are not limited to, perennial and intermittent creeks and drainages, lakes, seeps, and springs; emergent marshes; riparian wetlands; and seasonal wetlands. Federal and state agencies regulate these waters. In April 2019, the State Water Resources Control Board (SWRCB) adopted the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Materials to Waters of the State*, which covers wetlands not regulated by federal agencies.

There are no streams on or adjacent to the project site. The MID Hammatt Lateral, the nearest surface water to the project site, is approximately 100 feet away at its closest. No vernal pools, seasonal wetlands, marshes, ponds, creeks, lakes, or any other potentially jurisdictional Water of the U.S. or wetland were observed on the project site.

TABLE 3-3
SPECIAL-STATUS SPECIES DOCUMENTED IN THE PROJECT VICINITY

Common Name *Scientific Name*	**Federal Status[1]**	**State Status[2]**	**CNPS List[3]**	**Habitat**	**Potential for Occurrence**
Plants					
Succulent owl's clover *Castilleja campestris var. succulenta*	T	E	1B	Vernal pools.	Unlikely: there are no vernal pools on the project site.
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	E	1B	Vernal pools.	Unlikely: there are no vernal pools or seasonal wetlands on the project site.
Birds					
Swainson's hawk *Buteo swainsoni*	None	T	N/A	Nesting: large trees, usually within riparian corridors. Foraging: agricultural fields and annual grasslands.	Low: the site provides low-quality foraging habitat, and there are no large trees on or near the site that could be used for nesting.
Cooper's hawk *Accipiter cooperii*	None	WL	N/A	Nests in coniferous, deciduous, and mixed woods, typically those with tall trees and with openings or edge habitat nearby.	Unlikely: there is no suitable nesting habitat on or adjacent to the site.
Tricolored blackbird *Agelaius tricolor*	None	CE	N/A	Nests in dense brambles and emergent wetland vegetation associated with open water habitat.	Unlikely: there is no suitable nesting habitat on or adjacent to the site. This species may occasionally fly over or forage in the area.
White-tailed kite *Elanus leucurus*	None	FP	N/A	Herbaceous lowlands with variable tree growth and dense population of voles.	Unlikely: the site does not provide suitable habitat.
Mammals					
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	N/A	Open, dry annual or perennial grasslands and scrublands with loose textured soils for denning	Unlikely: the site does not provide suitable habitat.
Reptiles and Amphibians					
California tiger salamander *Ambystoma californiense*	T	T	N/A	Breeds in seasonal water bodies such as deep vernal pools or stock ponds. Requires small mammal	Unlikely: there are no suitable breeding ponds on the site and the sandy soils throughout the site are not suitable for aestivation.

Common Name *Scientific Name*	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence
				burrows for summer refugia.	
Giant garter snake *Thamnophis gigas*	T	T	N/A	Freshwater marsh and low gradient streams; adapted to drainage canals and irrigation ditches, primarily for dispersal or migration.	Unlikely: there is no suitable habitat on the site and this species is not known from the area.
Blunt-nosed leopard lizard *Gambelia silus*	E	E	N/A	Sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief. Requires small mammal burrows for cover.	Unlikely: the project site does not provide suitable habitat.
California red-legged frog *Rana draytonii*	T	SC	N/A	Lowlands and foothills in or near permanent sources of water with vegetation.	Unlikely: there is no suitable aquatic habitat on the project site.
Western pond turtle *Emys marmorata*	None	SC	N/A	Permanent or semi-permanent water bodies; require basking sites such as logs	Unlikely: there is no suitable aquatic habitat on the project site.
Coast horned lizard *Phrynosoma blainvillii*	None	SC	N/A	Coniferous forest, deciduous forest, scrub, and grassland habitats, usually in sandy soils.	Unlikely: the on-site grasslands are highly disturbed and do not provide suitable habitat.
Fish					
Steelhead – Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	T	None	N/A	Riffle and pool complexes with adequate spawning substrates within Central Valley drainages.	None: there is no suitable aquatic habitat on the project site.
Chinook salmon – Central Valley fall/late fall-run ESU *Oncorhynchus tshawytscha pop. 13*	None	SC	N/A	Deep-flowing pools and riffle complexes with adequate spawning substrates within Central Valley drainages.	None: there is no suitable aquatic habitat on the project site.
Delta smelt *Hypomesus transpacificus*	T	T	N/A	Shallow lower Delta waterways with submersed aquatic plants and other suitable refugia.	None: there is no suitable aquatic habitat on the project site and the site is well outside the range of this species.

Common Name *Scientific Name*	Federal Status[1]	State Status[2]	CNPS List[3]	Habitat	Potential for Occurrence
Pacific lamprey *Entosphenus tridentatus*	None	SC	N/A	Spawn in gravel-bottomed streams, at the upstream end of riffle.	None: there is no suitable aquatic habitat on the project site.
Kern brook lamprey *Lampetra hubbsi*	None	SC	N/A	Silty backwaters of large rivers in foothill regions.	None: there is no suitable aquatic habitat on the project site.
Invertebrates					
Vernal pool fairy shrimp *Branchinecta lynchi*	T	None	N/A	Vernal pools and seasonally inundated depressions in the Central Valley.	Unlikely: there are no vernal pools or seasonal wetlands on the project site.
Vernal pool tadpole shrimp *Lepidurus packardi*	E	None	N/A	Vernal pools and seasonally wet depressions in the Central Valley.	Unlikely: there are no vernal pools or seasonal wetlands on the project site.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	None	N/A	Elderberry shrubs in the Central Valley and surrounding foothills.	Unlikely: no blue elderberry shrubs are on the project site.

Notes: CNPS – California Native Plant Society.
[1] Federal: T - Threatened; E - Endangered.
[2] State: T - Threatened; E - Endangered; CE - Candidate for Endangered Status; SC - Species of Special Concern; FP - Fully Protected.
[3] CNPS: 1B - rare, threatened, or endangered in California and elsewhere.

Environmental Impacts and Mitigation Measures

a) Special-Status Species.

The special-status plants identified in the greater project vicinity generally occur in vernal pools. No vernal pools have been identified on the project site, and the site has been disturbed by utility work and mowing. Due to lack of suitable habitat, no special-status plant species are expected to occur on the project site.

Most of the identified special-status wildlife species are not expected to occur on the project due to lack of suitable habitat. Only one species has the potential to be found on the project site. Swainson’s hawk is a migratory hawk listed as a threatened species under the California Endangered Species Act. Swainson’s hawk are found in the Central Valley primarily during their breeding season; a population is known to winter in the San Joaquin Valley. Swainson's hawks prefer nesting sites that provide sweeping views of nearby foraging grounds consisting of grasslands, irrigated pasture, hay, and wheat crops. The Migratory Bird Treaty Act and California Fish and Game Code of California protect Swainson’s hawks year-round, as well as their nests during the nesting season (March 1 through September 15).

The site is within the nesting range of Swainson's hawk, although this species is not widespread in this part of the San Joaquin Valley. The nearest recorded occurrence of nesting Swainson's hawks in the area is in southern Livingston, in a tree along Main Street. Other nesting sites have been recorded along the Merced River to the northwest. However, there are no large trees on or near the project site that could be used by nesting Swainson's hawks, and the grasslands on the project site provide low-quality foraging habitat. Given this and the proximity of urban development, the project site has a low probability of supporting Swainson's hawk. Project impacts on special-status species would be less than significant.

b) Riparian and Other Sensitive Habitats.

While the Hammatt Lateral is west of the project site, it does not have any riparian vegetation, and the project in any case would not affect the canal. Other sensitive habitats that may be found in the San Joaquin Valley include vernal pools, oak woodlands, and native grasslands. None of these habitats were identified on the project site. The project would have no impact on riparian or other sensitive habitats.

c) State and Federal Jurisdictional Wetlands.

As noted, no wetlands or Waters of the U.S. were identified on the project site. The project would have no impact on wetlands and Waters of the U.S.

d) Fish and Wildlife Movement.

There are no streams either on or adjacent to the project site, so no fish movements would be affected by the project. There are no trees on the project site that raptors and other protected migratory birds could use for nesting. Although they are mowed, the grasslands on the site could provide suitable nesting habitat for smaller birds such as songbirds. Some of these birds may be migratory birds protected by the Migratory Bird Treaty Act. Development of the project could potentially disrupt their nesting activities. This is a potentially significant impact.

Mitigation described below would require a survey for nesting birds prior to construction and a delay in construction to protect active nests if any are found. Implementation of this mitigation measure would reduce project impacts on protected migratory birds to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

BIO-1: If project construction or vegetation removal commences during the general nesting season (March 1 through July 31), a pre-construction survey for all species of nesting birds shall be conducted. If active nests are found, work in the vicinity of the nests shall be delayed until the young have fledged. No surveys need to be taken should project construction or vegetation removal commence outside the general nesting season.

Significance After Mitigation: Less than significant

e) Local Biological Requirements.

Livingston Municipal Code Section 5-4-8 seeks to protect and preserve mature trees on private property. A permit shall be required for the removal of any mature tree measuring at least six inches in diameter, as measured four feet above grade at the base of the tree. No trees are on the project site; therefore, Livingston Municipal Code Section 5-4-8 would not apply. The City has no other ordinances applicable to biological resources. The project would have no impact related to local biological requirements.

f) Conflict with Habitat Conservation Plans.

Habitat Conservation Plans are plans prepared under Section 10 of the Endangered Species Act that allow activities that could result in an "incidental take" of listed species to occur. Such plans are required to have measures to mitigate impacts on listed species and to monitor the effectiveness of the mitigation. Natural Community Conservation Plans are California counterparts to Habitat Conservation Plans but are broader in their geographical range and conservation objectives, which include protection of ecosystems rather than specific species. There are no Habitat Conservation Plans, Natural Community Conservation Plans, or similar conservation plans that apply to the project site. The project would have no impact on Habitat Conservation Plans or similar plans.

3.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?				✓
b) Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?		✓		
c) Disturb any human remains, including those interred outside of formal cemeteries?		✓		

NARRATIVE DISCUSSION

Environmental Setting

Most of the information for this section was provided by the Livingston General Plan and EIR. Although the EIR was certified in 1999, cultural resource information in the EIR remains valid. Additional information was provided by a report prepared by the Central California Information Center at California State University Stanislaus, which provided the results of a records search. The report is available in Appendix C of this IS/MND.

Prehistoric Era

The City of Livingston lies within the historic territory of the Yokuts, which ranged from the Tehachapi Mountains to modern-day Stockton in the San Joaquin Valley. Settlements were oriented towards water resources, with major villages situated near waterways that provided reliable water supplies and substantial food sources. A Yokuts village was reported to have 200 to 300 people. Economic subsistence was based on acorns, along with gathering and processing of wild seeds and other vegetable foods. Rivers and streams provided fish, shellfish, and turtles, and game, wildfowl and small mammals were trapped to augment the diet. Trade with other tribes was well developed, as the Yokuts obtained resources not otherwise available in their territory, such as obsidian and shell beads. Diseases introduced by Europeans took their toll on the Yokuts and other tribes, as up to three-quarters of the population in the San Joaquin Valley died from malaria alone.

Several archaeological surveys have been conducted in the Livingston area prior to and during the preparation of the General Plan EIR. All survey efforts have yielded negative results. The General Plan EIR concluded that the Livingston area was probably never a prehistoric population center, and minor cultural resource sites that probably existed in the area at one time have been largely destroyed by extensive agricultural operations. A records search conducted by the Central California Information Center at California State University, Stanislaus, in conjunction with the preparation of this document found no documented prehistoric or historic resources on the project site.

In 2014, the California Legislature enacted Assembly Bill (AB) 52, which focuses on consultation with Native American tribes on land use issues potentially affecting the tribes. Section 3.18, Tribal Cultural Resources, discusses AB 52 and tribal cultural resources in more detail.

Historic Era

Livingston was originally named Cressey, after a major landowner in the area on whose property a railroad station was established by the Santa Fe Railroad. Renamed Livingston, reportedly in honor of the explorer Dr. David Livingstone, the first known plat of the town dates from 1872. Livingston became a shipping and supply center for surrounding farms and ranches. The City of Livingston was incorporated in 1922.

Since City incorporation, agriculture has been the main industry and source of jobs for Livingston residents. One of the first major companies to be established in Livingston was Foster Farms, which was started in 1939 in Modesto and moved to Livingston in 1959. E & J Gallo Wineries is another large employer in the area. It was established in Modesto in 1933 and is the largest exporter of California wines. The Yamato Colony, a Japanese agricultural community, was established in Livingston in 1904. Most of the area that once formed this colony is now part of the City, and the Yamato Colony Elementary School commemorates this part of Livingston's history (City of Livingston 2020).

Until 1996, SR 99 ran through the City. A traffic signal installed in the downtown area was the only traffic signal on SR 99 between Sacramento and the junction with Interstate 5 south of Bakersfield, which inspired the City's nickname "The Last Stop." In 1996, the SR

99 bypass around Livingston was completed, routing through traffic away from downtown Livingston (Fimrite 1996).

The Livingston General Plan EIR evaluated the potential for significant historical resources in Livingston. Previous studies had identified only two potential historical resources in Livingston: the Livingston Canal in the northern part of Livingston and the Arena Canal passing through southern Livingston. Both canals were considered ineligible for inclusion in the National Register of Historic Places, and neither are on or near the project site.

Environmental Impacts and Mitigation Measures

a) Historical Resources.

There are no existing structures on the site, so there are no structures that might be considered historical. A records search conducted at the Central California Information Center found no documented historical resources on the project site (CCIC 2021). Given past disturbance of the project site by agricultural activities, it is unlikely that any historical resources would be found intact. The project would have no impact on historical resources.

b) Archaeological Resources.

A records search conducted at the Central California Information Center found no documented prehistoric resources on the project site. Based on existing data, the project site has a low sensitivity for the possible discovery of prehistoric and historic archaeological resources (CCIC 2021). Given past disturbance of the project site by agricultural activities, it is unlikely that any archaeological resources would be found intact. However, it is conceivable that excavation associated with the project could unearth archaeological materials of significance that are currently unknown. Procedures to address archaeological discoveries if they should occur are set forth in the mitigation measure below. Implementation of this mitigation would reduce potential impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

CULT-1: If any subsurface cultural resources are encountered during construction of the project, the City of Livingston Community Development Department shall be notified and all construction activities in the vicinity of the encounter shall be halted until a qualified archaeologist can examine these materials and determine their significance. If the find is determined to be significant, then the archaeologist shall recommend further mitigation measures that would reduce potential effects on the find to a level that is less than significant. Recommended measures may include, but are not limited to, 1) preservation in place, or 2) excavation, recovery, and curation by qualified professionals. The project developer shall be responsible for retaining qualified professionals, implementing recommended mitigation measures, and documenting mitigation efforts in a written report to the City's Community Development Department, consistent with the requirements of the CEQA Guidelines.

Significance after Mitigation: Less than significant

c) Human Burials.

As with other cultural resources, it is not expected that any human burials, particularly those of Native Americans, would be uncovered by construction on the project site, given site disturbance and location distant from probable Native American settlements. However, it is conceivable that excavation associated with the project could uncover a previously unknown burial.

CEQA Guidelines Section 15064.5(e) describes the procedure to be followed when human remains are uncovered in a location outside a dedicated cemetery. All work in the vicinity of the find shall be halted, and the County Coroner shall be notified to determine if an investigation of the death is required. If the Coroner determines that the remains are Native American in origin, then the Coroner must contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the most likely descendants of the deceased Native American, and the most likely descendants may make recommendations on the disposition of the remains and any associated grave goods with appropriate dignity. If a most likely descendant cannot be identified, the descendant fails to make a recommendation, or the landowner rejects the recommendations of the most likely descendant, then the landowner shall rebury the remains and associated grave goods with appropriate dignity on the property in a location not subject to further disturbance.

Mitigation presented below would require compliance with CEQA Guidelines Section 15064.5(e) in the event human remains are encountered. Implementation of the mitigation measure would ensure that any human remains and associated grave goods encountered during project construction would be treated with appropriate dignity. Project impacts on human remains after mitigation would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

CULT-2: If project construction encounters evidence of human burial or scattered human remains, the contractor shall immediately notify the County Coroner and the City, which shall in turn notify the appropriate tribal representatives. The City shall notify other federal and State agencies as required. The City will be responsible for compliance with the requirements of California Health and Safety Code Section 7050.5 and with any direction provided by the County Coroner. If the human remains are determined to be Native American, the County Coroner shall notify the Native American Heritage Commission, which will notify and appoint a Most Likely Descendant. The Most Likely Descendant shall work with the City and a qualified archaeologist to decide the proper treatment of the human remains and any associated funerary objects in accordance with California Public Resources Code Sections 5097.98 and 5097.991. Avoidance is the preferred means of disposition of the burial resources.

Significance after Mitigation: Less than significant

3.6 ENERGY

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impacts 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?			✓	

NARRATIVE DISCUSSION

Environmental Setting

Electricity and natural gas are major energy sources for residences and businesses in California. In Merced County, electricity consumption in 2016 totaled approximately 3,559 million kilowatt-hours (kWh), of which approximately 2,840 million kWh were consumed by non-residential uses and the remainder by residential uses (CEC 2018a). In 2018, natural gas consumption in Merced County totaled approximately 120 million therms, of which approximately 96 million therms were consumed by non-residential uses and the remainder by residential uses (CEC 2018b).

Motor vehicle use accounts for substantial energy usage through the consumption of gasoline and diesel fuel. The Merced County Association of Governments (MCAG) estimated total vehicle miles traveled (VMT) within Merced County and its cities were approximately 2,725,000 miles daily in 2016 (MCAG 2018a). Estimated motor vehicle fuel consumption in Merced County in 2015 was 304,600 gallons of gasoline and 209,600 gallons of diesel fuel per day. Fuel consumption per capita was 1.89 gallons per day (MCAG 2018b).

The State of California has adopted comprehensive energy efficiency standards as part of its Building Standards Code, California Code of Regulations, Title 24. Part 6 of Title 24 is referred to as the California Energy Code. In 2009, the California Building Standards Commission adopted a voluntary Green Building Standards Code, also known as CALGreen, which became mandatory in 2011. CALGreen sets forth mandatory measures, applicable to new residential and nonresidential structures as well as additions and alterations, on water efficiency and conservation, building material conservation, and interior environmental quality. It also mentions energy efficiency, although CALGreen defers to the Energy Code for actions. The City has adopted the 2019 versions of both the California Energy Code and CALGreen.

Environmental Impacts and Mitigation Measures

a) Project Energy Consumption.

Project construction would involve fuel consumption and use of other non-renewable resources. Construction equipment used for such improvements typically runs on diesel fuel or gasoline. The same fuels typically are used for vehicles that transport equipment and workers to and from a construction site. However, construction-related fuel consumption would be finite, short-term, and consistent with construction activities of a similar character. This energy use would not be considered wasteful, inefficient, or unnecessary.

Electricity may be used for equipment operation during construction activities. It is expected that more electrical construction equipment would be used in the future, as it would generate fewer air pollutant emissions. This electrical consumption would be consistent with construction activities of a similar character; therefore, the use of electricity in construction activities would not be considered wasteful, inefficient, or unnecessary, especially since fossil fuel consumption would be reduced. Moreover, under California's Renewables Portfolio Standard, a greater share of electricity would be provided from renewable energy sources over time, so less fossil fuel consumption to generate electricity would occur. Section 3.8, Greenhouse Gas Emissions, discusses the Renewables Portfolio Standard in detail.

The most recent Residential Energy Consumption Survey by the U.S. Energy Information Administration found that average annual energy consumption by apartment units in buildings with five or more units located in the western United States was 4,581 kWh of electricity per household and 159 cubic feet of natural gas per household (EIA 2018). Based on these factors, proposed development on the project site would consume approximately 364,880 kWh of electricity and 12,720 cubic feet of natural gas annually.

The project would be required to comply with applicable provisions of the adopted California Energy Code and CALGreen in effect at the time of project approval. The provisions of these codes are intended to increase energy efficiency of buildings, thereby reducing energy consumption. Compliance with these standards would reduce energy consumption associated with project operations. Overall, project construction and operations would not consume energy resources in a manner considered wasteful, inefficient, or unnecessary. Project impacts related to energy consumption would be less than significant.

b) Consistency with Energy Plans.

The City does not have adopted plans for renewable energy or energy efficiency. However, the City has adopted the California Energy Code and CALGreen, both of which contain provisions that promote energy efficiency. The project would be required to comply with the applicable requirements of these two codes, which are designed to improve energy efficiency of structure, thereby forwarding State energy conservation goals. Project impacts related to energy plans would be less than significant.

3.7 GEOLOGY AND SOILS

Would the project:

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			✓	
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 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?		✓		

NARRATIVE DISCUSSION

Environmental Setting

Topography and Geology

The project site lies in the San Joaquin Valley in central California. The San Joaquin Valley is the southern portion of the Great Valley Geomorphic Province, which is a topographically flat, northwest-trending, structural trough about 50 miles wide and 450 miles long. The San Joaquin Valley is filled with thick sedimentary rock sequences that were deposited as much as 130 million years ago. Large alluvial fans have developed on each side of the Valley. The Geologic Map of the San Francisco – San Jose Quadrangle (Wagner et al. 1991) designates the underlying geology of the project site as the Modesto Formation, consisting of Quaternary (geologically recent) sediments.

Project Site Soils

Most of the soils in the San Joaquin Valley consist of sand, silt, loamy clay alluvium, peat, and other organic sediments. These soils are the result of long-term natural soil deposition and the decomposition of marshland vegetation. According to a custom soil survey for the project site, available in Appendix D of this IS/MND, Delhi sand is the only soil type on the project site. Delhi sand is a deep, somewhat excessively drained soil type with rapid permeability and very low water-holding capacity. Little to no runoff is produced. The wind erosion hazard is severe, and water erosion is evident where irrigation water has been applied too rapidly. The shrink-swell potential of Delhi sand is low. The risk of corrosion is high for uncoated steel and low for concrete (SCS 1962, NRCS 2021).

Title 4, Chapter 6 of the Livingston Municipal Code sets forth provisions for grading of construction sites such that erosion and sedimentation are controlled. These provisions regulate and control the design, construction, quality of materials, use, location, and maintenance of grading, excavating and fill, land disturbances, land fill and soil storage in connection with the clearing and grading of land for construction within the City. No grading or excavation is allowed without a grading permit issued by the City. An application for a grading must include, among other requirements, an interim and final erosion and sedimentation control plan and a geotechnical/soils investigation report if the grading operation exceeds 1,000 cubic yards.

For all projects that disturb one acre of land or more a Construction General Permit is required from the SWRCB. The permit requirements include preparation of a Storm Water Pollution Prevention Plan (SWPPP) by a Qualified SWPPP Developer to address potential water quality issues. A SWPPP specifies the Best Management Practices (BMPs) needed to avoid or minimize adverse water quality impacts. Construction BMPs fall within the general categories of Temporary Soil Stabilization, Temporary Sediment Control, Wind Erosion Control, Tracking Control, Non-Storm Water Management, and Waste Management and Materials Pollution Control. BMPs applicable to the project are incorporated in the SWPPP as required. BMPs are incorporated into project improvement plans and specifications, subject to the approval of the City Engineer. BMP function and effectiveness are monitored and reported, and remediation is required to address pollution occurrence.

Seismic and Geologic Hazards

There is no record of seismic activity originating in the Livingston area, and no faults have been mapped (City of Livingston 1999a). However, the Livingston General Plan EIR identifies ground shaking as a potential hazard, noting the City is located between two major fault systems – the San Andreas Fault System 59 miles to the west, and the Mother Lode Fault System 42 miles to the east (City of Livingston 1999b). Additionally, the Ortigalita Fault, an active Holocene fault, is located approximately 30 miles west of the project site.

Paleontological Resources

The geological materials underlying the project site include the sedimentary deposits of the Modesto Formation. The Modesto Formation is considered to have a relatively high sensitivity for paleontological resources. Fossil specimens recovered from one location in Merced County underlain by the Modesto Formation included larger mammals such as mammoth, giant ground sloth, dire wolf, bison, and horse, along with smaller mammals, birds, reptiles, and amphibians (Caltrans 2015). The project site does not contain any known paleontological resources or unique geological features.

Environmental Impacts and Mitigation Measures

a-i) Fault Rupture Hazards.

As noted above, no faults, including active or potentially active faults, have been mapped in the Livingston area. The project site is not in an area designated as an Alquist-Priolo Earthquake Fault Zone (California Geological Survey 2015). The closest designated active fault is the Ortigalita fault, which is a Holocene fault approximately 29 miles to the west of the project site. The project would have no impact related to a fault rupture hazard.

a-ii, iii) Seismic Hazards.

As noted above, while no seismic activity events have been recorded in Livingston, the City and project site are potentially subject to ground shaking from nearby fault systems, which represent a hazard to buildings and infrastructure. All new buildings in Livingston are required to be built in accordance with the most recent version of the California Building Code adopted by the City. The California Building Code includes seismic safety provisions that require buildings to be constructed to withstand anticipated ground shaking, based on occupancy type.

When coarse sediments are saturated and compact during an earthquake, soils may lose strength and become fluid, a process called liquefaction. Water from voids may be forced to the ground surface, where it emerges in the form of mud spouts or sand boils. The Livingston General Plan does not identify significant liquefaction hazards in the area. As discussed in Section 3.10, Hydrology and Water Quality, groundwater levels in the Livingston area are in the range of 60-80 feet below the ground surface, and liquefaction occurs in areas with relatively shallow depths to groundwater. Project impacts related to seismic hazards are considered less than significant.

a-iv) Landslides.

The topography of the project site and surrounding area is flat; therefore, landslides would not occur. The project would have no impact related to landslides.

b) Soil Erosion.

Because of its sandy characteristics, the Delhi sand soil on the project site is susceptible to both wind and water erosion. Compliance with SJVAPCD Regulation VIII, which is discussed in Section 3.3, Air Quality, would reduce potential wind erosion impacts. Compliance with the provisions of Livingston Municipal Code Title 4, Chapter 6 would minimize potential water erosion impacts. The project would also be required to comply with the provisions of the Construction General Permit from the SWRCB, including preparation of a SWPPP, which is required by the mitigation measure below. Compliance with the mitigation measure, along with other applicable regulations, would minimize the amount of sediment that leaves the construction site and potential construction water quality effects, thereby reducing soil erosion impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

GEO-1: Prior to commencement of construction activity, the developer shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for the project and file a Notice of Intent with the State Water Resources Control Board (SWRCB) in compliance with the Construction General Permit and City of Livingston storm water requirements. The SWPPP shall be available on the construction site at all times. The developer shall incorporate an Erosion Control Plan consistent with all applicable provisions of the SWPPP within the site improvement and building plans. The developer also shall submit the SWRCB Waste Discharger's Identification Number to the City prior to approval of development or grading plans.

Significance after Mitigation: Less than significant

c) Geologic Instability.

The Livingston General Plan states that the City's low elevation and mild topography negate other seismic hazards, such as settlement and liquefaction (City of Livingston 1999a). The soils underlying the sites where the facilities would be constructed have not been identified as inherently unstable or prone to failure. The project is not expected to change existing conditions related to geologic stability. Required engineering design of proposed structures and site improvements would minimize soil stability hazards to a level that would be less than significant.

d) Expansive Soils.

As noted, Delhi sand is rated as having low shrink-swell potential. Expansive soils are associated with soils with substantial clay content. The Delhi sand soil is sandy and has little to no clay content. Since Delhi soils have low shrink-swell potential, building foundations and site infrastructure would not be subject to damage from expansive soils. The project would have no impact related to expansive soils.

e) Adequacy of Soils for Sewage Disposal.

The project would be connected to the City's wastewater system. It does not propose to install any septic system or other onsite wastewater disposal system. Because of this, the project would have no impact related to soil adequacy for sewage disposal.

f) Paleontological Resources and Unique Geological Features.

The project site is flat and contains no geological features that may be considered unique. Given past activities on and near the project site, it is unlikely that any intact paleontological resources would be encountered. However, the project site is underlain by the Modesto Formation, which has been a source of paleontological finds. Because of this, it is conceivable that currently unknown resources may be uncovered during project construction activities. Procedures to address paleontological discoveries should they occur are set forth in the mitigation measure below. Implementation of this mitigation measure would reduce potential impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

GEO-2: If any subsurface paleontological resources are encountered during construction of the project, the City of Livingston Community Development Department shall be notified and all construction activities in the vicinity of the encounter shall be halted until a qualified paleontologist can examine these materials and determine their significance. If the find is determined to be significant, then the paleontologist shall recommend mitigation measures that would reduce potential effects on the find to a level that is less than significant. Recommended measures may include, but are not limited to, 1) preservation in place, or 2) excavation, recovery, and curation by qualified professionals. The project developer shall be responsible for retaining qualified professionals, implementing recommended mitigation measures, and documenting mitigation efforts in a written report to the City's Community Development Department, consistent with the requirements of the CEQA Guidelines.

Significance after Mitigation: Less than significant

3.8 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 an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			✓	

NARRATIVE DISCUSSION

Environmental Setting

GHG Background

Greenhouse gases (GHGs) are gases that absorb and emit radiation within the thermal infrared range, trapping heat in the earth's atmosphere. GHGs are both naturally occurring and are emitted by human activity. GHGs include carbon dioxide, the most abundant GHG, as well as methane, nitrous oxide, and other gases. GHG emissions in California in 2018, the most recent year for which data are available, were estimated at approximately 425 million metric tons carbon dioxide equivalent (CO_2e) – a decrease of approximately 13% from the peak level in 2004. Transportation was the largest contributor to GHG emissions in California, with approximately 40% of total emissions. Other significant sources include industrial activities, with approximately 21% of total emissions, and electric power generation, both in-state and imported, with approximately 15% of total emissions (ARB 2020). No data on GHG emissions in Livingston are available.

The State of California has prepared Climate Change Assessments that provide scientific assessments on the potential impacts of climate change in California by region. Potential climate change impacts occurring in the San Joaquin Valley and adjacent areas include the following (Westerling et al. 2018):

- Acceleration of warming across the region and state.
- More intense and frequent heat waves.
- Higher frequency of catastrophic floods.
- More intense and frequent drought.
- More severe and frequent wildfires.

Unlike the criteria air pollutants described in Section 3.3, Air Quality, GHGs have no "attainment" standards established by the federal or State government. In fact, GHGs are not generally thought of as traditional air pollutants because their impacts are global in nature, while air pollutants mainly affect the general region of their release to the atmosphere (SJVAPCD 2015). Nevertheless, the U.S. Environmental Protection Agency (EPA) has found that GHG emissions endanger both the public health and public welfare under Section 202(a) of the Clean Air Act due to their impacts associated with climate change (EPA 2009).

GHG Emission Reduction Plans

The State of California has implemented GHG emission reduction strategies through AB 32, the Global Warming Solutions Act of 2006, which requires total statewide GHG emissions to reach 1990 levels by 2020, or an approximately 29% reduction from 2004 levels. In compliance with AB 32, the State adopted the Climate Change Scoping Plan in 2008 and updated the plan in 2014. Primary strategies addressed in the original Scoping Plan included new industrial and emission control technologies; alternative energy generation technologies; advanced energy conservation in lighting, heating, cooling and ventilation; fuels with reduced carbon content; hybrid and electric vehicles; and methods for improving vehicle mileage (ARB 2008). The 2014 update highlights California's progress toward meeting the 2020 GHG emission reduction goal of the original Scoping Plan, and it establishes a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050 (ARB 2014). The 2018 state GHG emissions were approximately six million metric tons CO_2e below the 2020 target established by AB 32 (ARB 2020).

In 2016, Senate Bill (SB) 32 was enacted. SB 32 extends the GHG reduction objectives of AB 32 by mandating statewide reductions in GHG emissions to levels that are 40% below 1990 levels by the year 2030. The State has adopted an updated Scoping Plan that sets forth strategies for achieving the SB 32 target. The updated Scoping Plan continues many of the programs that were part of the previous Scoping Plans, including the cap-and-trade program, low-carbon fuel standards, renewable energy, and methane reduction strategies. It also addresses, for the first time, GHG emissions from the natural and working lands of California, including the agriculture and forestry sectors (ARB 2017).

The SJVAPCD adopted a Climate Change Action Plan in 2008 and issued guidance for development project compliance with the plan in 2009. The guidance adopted an approach that relies on the use of Best Performance Standards to reduce GHG emissions. Projects implementing Best Performance Standards would be determined to have a less than cumulatively significant impact. For projects not implementing Best Performance Standards, demonstration of a 29% reduction in project-specific (i.e., operational) GHG emissions from business-as-usual conditions is required to determine that a project would have a less than cumulatively significant impact (SJVAPCD 2009).

Cities and counties throughout California have prepared Climate Action Plans that outline how the local government will reduce GHG emissions, which are typically related to the 2020 emission reduction target set in the State's Climate Change Scoping Plan. The City currently has no Climate Action Plan or other GHG reduction plan.

SB 375, enacted in 2008, requires metropolitan planning organizations to develop a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan (RTP) preparation process. An SCS must demonstrate an approach to how land use development and transportation can work together to meet GHG emission reduction targets for cars and light trucks. MCAG, the metropolitan planning organization for Merced County and its incorporated cities, adopted its current RTP/SCS in 2018. The target for Merced County, set by the ARB in 2010, calls for the region to reduce per capita GHG emissions by 5% by 2020 and 10% by 2035 (MCAG 2018a).

Environmental Impacts and Mitigation Measures

a, b) Project GHG Emissions and Consistency with GHG Reduction Plans.

The CalEEMod model estimated the total GHG construction and operational emissions associated with the project (see Appendix A). Table 3-4 presents the results of the CalEEMod run.

TABLE 3-4
PROJECT GHG EMISSIONS

GHG Emission Type	Unmitigated Emissions	Mitigated Emissions
Construction[1]	154.63	154.63
Operational[2]	208.19	190.57

[1] Total GHG emissions for construction period in metric tons carbon dioxide equivalent (CO_2e).
[2] Annual emissions in metric tons CO2e.
Sources: California Emissions Estimator Model v. 2016.3.2.

"Mitigated emissions" are the result of project compliance with applicable laws, rules, and regulations, along with inclusion of project features that reduce GHG emissions. These include the following:

- The density of residential development on the project site (20 dwelling units per acre).
- The project site is approximately 0.3 miles from a transit stop and from downtown Livingston.
- The project offers all apartment units at a rent affordable to specified lower-income households.
- The project would add sidewalks to the site that would connect to the existing network in the vicinity.
- SB X7-7, enacted in 2009, sets an overall goal of reducing per capita urban water use by 20% by December 31, 2020. The California Green Building Code mandates a 20% reduction in indoor water use.

- AB 341 establishes the goal of diverting 75% of California's waste stream from landfills by 2020.

GHG construction emissions would be limited due to the length of time of construction activity; these emissions would cease once work is completed. Mitigated operational GHG emissions would be approximately 8.5% less than under business-as-usual (unmitigated) conditions.

Approximately 83% of the GHG emission reduction programs in the Scoping Plan counted toward meeting the 29% objective for 2020 are State-level programs, with the remaining 17% to be achieved by programs at the local government level, including development review. Thus, the local action share of the 29% reduction would be 4.93%. Based on this, it can be assumed that a development project that achieves at least a 4.93% reduction in GHG emissions from business-as-usual levels would be consistent with the objectives of both State and SJVAPCD GHG reduction plans. The 8.5% reduction associated with the project would exceed this local share.

The project would also be consistent with the goal of reducing per capita GHG emissions through compact growth, as set forth in the RTP/SCS. One of the strategies is to direct growth to existing communities through investments that provide a range of housing choices for existing and new residents. The project would be consistent with this strategy. Overall, impacts related to GHG emissions and GHG reduction plans would be less than significant.

3.9 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				✓
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 or excessive noise 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?				✓

NARRATIVE DISCUSSION

Environmental Setting

This section focuses on hazards associated with hazardous materials, proximity to airports, and wildfires. Geologic and soil hazards are addressed in Section 3.7, Geology and Soils, and potential flooding hazards are addressed in Section 3.10, Hydrology and Water Quality.

Data on recorded hazardous material sites are kept in the GeoTracker database, maintained by the SWRCB, and in the EnviroStor database, maintained by the California Department of Toxic Substances Control (DTSC). Both GeoTracker and EnviroStor provide the names and addresses of documented hazardous material sites, along with their cleanup status. A search of both GeoTracker and EnviroStor databases indicated no hazardous material sites within or in the vicinity of the project (SWRCB 2021, DTSC 2021). A list of solid waste disposal sites identified by SWRCB with waste constituents above hazardous waste levels outside the waste management unit did not show any locations in the Livingston area (CalEPA 2021a). Likewise, a list by SWRCB containing sites under Cease and Desist Orders and Cleanup and Abatement Orders showed no locations on or near the project site (CalEPA 2021b).

There are no airports in the Livingston area. The nearest airport to the project site is Turlock Municipal Airport in Turlock in Stanislaus County, approximately eight miles to the northwest. Castle Airport in Atwater is approximately nine miles to the east.

The Livingston General Plan states that wildland fire hazards threaten life and property within the Livingston vicinity. Wildland fires are an annual hazard in Merced County. Wildland fires burn natural vegetation on undeveloped lands and include rangeland, brush, and grass fires. Long, hot, and dry summers with temperatures often exceeding 100°F add to the County's fire hazard. Human activities are the major causes of wildland fires, while lightning causes the remaining wildland fires. High hazard areas for wildland fires in Livingston are the grass and brush-covered areas located east of the City (City of Livingston 1999a). The project site is not within these areas.

Environmental Impacts and Mitigation Measures

a) Hazardous Material Transport, Use, and Storage.

Hazardous materials that are likely to be used and stored on the project site would include cleaning products, and pesticides, herbicides, and fertilizers for landscaping none likely to be stored or used in large quantities. Facilities that store significant amounts of hazardous materials are required to prepare a Hazardous Material Business Plan that would be submitted to the County Environmental Health Department. The Hazardous Material Business Plan must be prepared by any facility that handles a hazardous material, or mixture containing a hazardous material, of a quantity at any one time during the reporting year equal to or greater than 55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for a compressed gas. None of the anticipated hazardous materials to be used by the project would be stored in such quantities. Project impacts related to transport, use, or storage of hazardous materials would be less than significant.

b) Release of Hazardous Materials.

Construction activities on the project site may involve the use of hazardous materials such as fuels and solvents, and thus create a potential for hazardous material spills. Construction and maintenance vehicles would transport and use fuels in ordinary quantities. Fuel spills, if any occur, would be minimal and localized and would not typically have significant adverse effects. Potential hazardous materials spills during construction are addressed in the required SWPPP, described in Section 3.7, Geology and Soils. In accordance with SWPPP requirements, contractors have absorbent materials at construction sites to clean up minor spills. Other substances used in the construction process would be stored in approved containers and used in relatively small quantities, in accordance with the manufacturers' recommendations and/or applicable regulations.

As noted in a) above, project operations would not involve the transport, use, or storage of hazardous materials in substantial quantities. Any releases of these materials are not expected to be in quantities large enough to pose a threat to human health and the environment. Overall, impacts related to releases of hazardous materials would be less than significant.

c) Hazardous Materials Releases near Schools.

The nearest school facility to the project site is Selma Herndon Elementary School, located behind the LUSD offices across B Street from the project site. However, as noted in b) above, project construction and operations would not require the handling or transport of acutely hazardous materials or waste that would endanger schools or the public. The use of small quantities of hazardous materials during project construction would be limited to the project site and would not occur near any schools. The project would not produce hazardous emissions. The project would have no impact on schools within one-quarter mile of the project site.

d) Hazardous Materials Sites.

As previously noted, a search of the GeoTracker and EnviroStor databases, along with SWRCB lists, did not identify any active hazardous material sites on or near the project site. As noted in Section 3.2, Agriculture and Forestry Resources, no agricultural activities have occurred on the project site for at least two decades, so contamination of the soil by residual agricultural chemicals is unlikely. The project would have no impact related to hazardous material sites.

e) Public Airport Operations.

As noted, there are no airports in the Livingston area. The project would have no impact related to potential airport hazards.

f) Emergency Response and Evacuations.

The only street that would be affected by the project would be B Street. The project would not obstruct B Street traffic once construction work is completed. Project work within B Street would consist of connections to utility lines and frontage improvements such as curb, gutter, and sidewalk. Construction work would be temporary and would cease once work is completed. However, work within B Street has the potential of restricting lanes such that emergency response or emergency evacuation could be affected. Mitigation presented below would ensure that access would be maintained during construction activities within B Street, thereby reducing impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

HAZ-1: Prior to the start of project construction, the developer shall prepare and implement a Traffic Control Plan, which shall include such items as traffic control requirements, resident notification of access closure, and daily access restoration. The contractor shall specify dates and times of road closures or restrictions, if any, and shall ensure that adequate access will be provided for emergency vehicles. The Traffic Control Plan shall be reviewed and approved by the City Department of Public Works and shall be coordinated with the Livingston Police Department and the Merced County Fire Department if construction will require road closures or lane restrictions.

Significance After Mitigation: Less than significant

g) Wildland Fire Hazards.

Section 3.20, Wildfire, provides a more detailed analysis of wildfire impacts. The project site is in a mainly developed area, except for vacant land to the west, that is not susceptible to wildfires. The project would reduce the existing fire hazard on the site by replacing the existing grasses and weeds with a developed and paved area. The project would have no impact related to wildfires.

3.10 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground 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 runoff or through the addition of impervious surfaces, in a manner which would:				
i) Result in substantial erosion or siltation on- or off-site?			✓	
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			✓	
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?				✓

NARRATIVE DISCUSSION

Environmental Setting

Surface Waters

There are no natural streams on or near the project site. The nearest surface water feature is the Hammatt Lateral, an unlined canal west of the project site. The Hammatt Lateral, owned by MID, provides irrigation water to MID customers. MID canals also serve as part of the City's storm drainage system (see Section 3.19, Utilities and Service Systems). Another channel, which comes from the commercial center to the west, intersects the Hammatt Lateral adjacent to B Street.

Surface water quality in the Livingston area is maintained through the City's Storm Water Management Program (SWMP), developed in compliance with the federal National Pollutant Discharge Elimination System (NPDES) program and with the SWRCB's Municipal Separate Storm Sewer Systems (MS4) General Permit. The program includes control measures and defines BMPs designed to protect surface water quality associated with land development during both construction and post-construction periods (City of Livingston 2007a).

Post-construction elements of the SWMP are governed by City ordinances that require compliance with the City's adopted SWMP, as permitted by the Central Valley RWQCB Order No. 2003-0005-DWQ. The SWMP identifies a range of post-construction BMPs that must be incorporated into development plans. BMPs may include, but are not limited to, vegetated buffer strips and swales, detention basins, vaults and wetlands, and various filtration and infiltration and structures devices, among others. Under new NPDES requirements applicable to the City, storm water discharge volumes associated with new development cannot exceed existing discharges. Volume control can be achieved through a combination of low-impact development and specific measures.

Groundwater

The project site is within the Merced Groundwater Subbasin, which underlies 767 square miles of central and eastern Merced County. The estimated storage capacity of the Merced Subbasin as of 1995 was 21,100,000 acre-feet to a depth of 300 feet and 47,600,000 acre-feet to the base of fresh groundwater (DWR 2018). Both natural and applied water recharge in the Subbasin was estimated at 290,000 acre-feet, while urban and agricultural extractions totaled 546,000 acre-feet. This has led to a decline in groundwater levels of 30 feet between 1970 and 2000, although there was a period of groundwater level increase from 1978 to 1988 (DWR 2018).

The City relies on groundwater for its water supply, which is provided by eight wells (see Section 3.19, Utilities and Service Systems). In the Livingston area, the depth to the groundwater table ranges from 60 to 80 feet below ground surface (DWR 2018). Groundwater quality in the Livingston area is generally good, but water from one of the City's wells was found to have exceeded the State's Maximum Contaminant Level for arsenic and is currently shut down. Samples of City water were also found to exceed the State's Maximum Contaminant Level for 1,2,3-trichloropropane, an ingredient in a now-banned fumigant. The City is working on treatment systems to remove this contaminant and anticipates resolving this issue by the end of 2021 (City of Livingston 2019).

In 2014, the State enacted the Sustainable Groundwater Management Act. This act requires the formation of local groundwater sustainability agencies that must assess conditions in their local water basins and adopt locally based Groundwater Sustainability Plans for sustainable use of groundwater and avoidance of overdraft. Plans for "critically overdrafted" basins must be completed and adopted by January 31, 2020, while plans for high- and medium-priority basins have an adoption deadline of January 31, 2022. The Merced Irrigation-Urban Groundwater Sustainability Agency, of which the City is a member, was formed in 2017. A Groundwater Sustainability Plan for the Subbasin, classified as critically overdrafted, was adopted on January 28, 2020.

The primary means for achieving sustainability in the Subbasin will be reduction in groundwater pumping achieved through implementation of a framework to allocate the sustainable yield to the Groundwater Sustainability Agencies. This framework will be supplemented by the implementation of projects and management actions that will either increase surface water supplies to augment the sustainable groundwater yield or will increase groundwater recharge, which will in turn increase the amount of groundwater that may be sustainably used (Merced SGMA 2019).

Flooding Hazard

A Flood Insurance Rate Map prepared by the Federal Emergency Management Agency (FEMA) indicates that the project site is designated Zone X. Zone X is considered an area of minimal flood hazard. It is outside a delineated 100-year floodplain – the floodplain commonly used to assess potential flooding impacts and considered a Special Flood Hazard Area (FEMA 2008). The project site is within the potential inundation area due to failure the New Exchequer Dam on the Merced River (Merced County 2013a). The New Exchequer Dam, operated by MID, forms the Lake McClure reservoir, which has a storage capacity of approximately one million acre-feet.

In 2007, the State of California approved SB 5 and a series of related Senate and Assembly bills intended to set new flood protection standards for urban areas in the Central Valley. This group of bills, referred to collectively in this document as "SB 5," establish the State standard for flood protection in these areas as protection from the 200-year frequency flood. Under SB 5, urban and urbanizing areas must be provided with 200-year flood protection no later than 2025. Preliminary maps drafted by the California Department of Water Resources indicate the project site is outside the 200-year floodplain.

Environmental Impacts and Mitigation Measures

a) Surface Water Quality.

The project would not directly affect surface waters. As noted in Section 3.7, Geology and Soils, construction activities would disturb soils and soil materials, which could be transported off site by runoff and could eventually enter surface waters. Project development and operation would lead to contamination of storm runoff with fuels, oils, metals, and other substances associated with motor vehicles, particularly from the parking areas. If the project proposes to develop the retention basin option, then contaminants would remain onsite, as they would be filtered from the collected runoff by percolation. However, if the project proposes to connect to the City's Storm drainage system, then the potentially contaminated runoff could eventually enter surface waters. This is considered a potentially significant impact.

As noted, the City of Livingston has adopted a SWMP, which is intended to minimize the potential storm water quality impacts of development. Program elements most applicable to land development include construction storm water discharge requirements, industrial discharge requirements and the incorporation of post-construction BMPs. Storm water from areas of new development must be treated using the post-construction BMPs specified in the SWPPP. These measures will be specified during the design phase of the project.

Developers are required to enter into an agreement for maintenance of the post-construction BMPs.

Compliance with the provisions of the City's SWMP, which are specified in the mitigation measures below, would reduce impacts to a level that would be less than significant. In addition, implementation of Mitigation Measure GEO-1, described in Section 3.7, Geology and Soils, would minimize water quality impacts from construction activities, along with compliance with SJVAPCD Regulation VIII.

Level of Significance: Potentially significant

Mitigation Measures

HYDRO-1: The developer shall submit a Storm Water Quality Plan for the project that shall include post-construction Best Management Practices (BMPs) as required by the City's Storm Water Management Program. The Storm Water Quality Plan shall be reviewed and approved by the City of Livingston Public Works Department prior to approval of project improvement plans.

HYDRO-2: If required, the developer shall execute a Maintenance Agreement with the City for stormwater BMPs prior to receiving a Certificate of Occupancy. The developer shall remain the responsible party and provide funding for the operation, maintenance and replacement costs of the proposed treatment devices built for the project.

HYDRO-3: The developer shall comply with applicable requirements of, and pay all associated fees as required by, the City's Storm Water Pollution Prevention Program as set forth in its NPDES Storm Water Permit.

Significance After Mitigation: Less than significant

b) Groundwater Supplies.

As noted, the City relies on groundwater for its primary source of water. The project would not draw directly from the underlying aquifer, but it would be connected to the City's water system, and so it would indirectly affect groundwater supplies. Adequate water supply exists to accommodate this demand. Section 3.19, Utilities and Service Systems, discusses this in detail.

The project would replace an existing vacant parcel of grasses and weeds with urban development and pavement. This would substantially reduce the amount of precipitation that would percolate into the ground at the site, thereby reducing groundwater recharge. Given the relatively small acreage of the project site and the extent of other lands available for recharge in and surrounding the City, the project is not expected to interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. The Merced Integrated Regional Water Management Plan indicates an abundance of available land suitable for groundwater recharge in the Livingston vicinity (RMC Water and Environment 2013). Project impacts on groundwater are considered less than significant.

c-i, ii, iii) Drainage Patterns and Runoff.

The project would alter existing storm drainage patterns, due to site grading and the installation of buildings and pavement. In addition, proposed improvements on the project site would result in the generation of additional runoff due to the introduction of impervious surfaces. As noted in a) above, runoff would be likely to collect pollutants, mainly deposits from motor vehicles.

The project proposes two options for the collection and disposal of storm drainage. One is the construction of an onsite storm water drainage system which would collect all runoff generated on the project site and deliver it to a retention basin, in accordance with City standards and specifications. The storm drainage system is expected to have adequate capacity to accommodate onsite runoff. As the collected runoff would be retained on site, the project would not contribute this potential polluted runoff to the City's storm drainage system or to other waters. It is expected that these pollutants would be filtered as the runoff in the retention basins percolates into the ground, thereby preserving the water quality of aquifers beneath the project site. As noted, depth to groundwater in the project vicinity ranges from 60 to 80 feet below ground surface.

The other option would be for the project to connect to the City's existing storm drainage system. Specifically, the project would connect to existing facilities located at Briarwood Drive to the west. Drainage plans would be submitted for City approval prior to construction. Drainage improvements would need to comply with City design standards and BMPs contained in the City's SWMP, which was prepared with the intent of maintaining surface water quality in the Livingston area.

In summary, both options would be required to comply with City standards and specification regarding collection of storm drainage, and with additional requirements regarding discharge if connection with the City's system is pursued. Project impacts on drainage and runoff are considered less than significant.

c-iv) Flood Flows.

As noted, the project site is not within a 100-year floodplain as indicated by the FEMA map for the area, nor is it within a 200-year floodplain as indicated by the Department of Water Resources in accordance with SB 5. Because of this, the project would be unlikely to impede or redirect any flood flows. The project would have no impact related to flood flows.

d) Other Flooding Hazards.

As noted, the project site is within the potential inundation zone of New Exchequer Dam were it to fail. The Merced County General Plan states that the probability of failure of the dam as being low (Merced County 2013a). There are no levees in the Livingston area, so there is no hazard associated with levee failure. The project site is in a topographically flat region away from the coast, with no large bodies of water in the vicinity. Therefore, the project would not be affected by seiche, or tsunamis. Project impacts related to other flooding hazards would be less than significant.

e) Conflict with Water Quality or Groundwater Plans.

As described above, the project would be required to comply with the provisions of the City's SWMP, which is designed to maintain local water quality. The Groundwater Sustainability Plan for the Merced Subbasin has been adopted. There are no projects or implementing actions in the Groundwater Sustainability Plan for the Merced Subbasin that apply specifically to the project. However, it is expected that the project would comply with any applicable City regulations or programs that are designed to implement the Groundwater Sustainability Plan. The project would have no impact related to water quality or groundwater plans.

3.11 LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?			✓	

NARRATIVE DISCUSSION

Environmental Setting

The project site is a flat, undeveloped area that is vacant. As noted in Chapter 2.0, Project Description, the current City General Plan designation for the project site is Highway Service Commercial, and the current zoning is C-3, Service Commercial. The area surrounding the project site consists of a mix of vacant and developed land. As noted in Chapter 1.0, Introduction, the site is bordered on the east by apartment residential development, to the south by LUSD offices and the Sikh temple, and to the north by SR 99. Lands to the west are currently vacant and are zoned for Service Commercial uses.

Environmental Impacts and Mitigation Measures

a) Division of Established Communities.

The project site is a part of a planned residential area that would provide additional housing units and address an identified housing shortage in the City of Livingston, consistent with the objectives of the Housing Element of the Livingston General Plan. The project would not divide existing residential communities in the area, which are located east of the project site. The project would have no impact on division of established communities.

b) Conflicts with Plans, Policies and Regulations Mitigating Environmental Effects.

Project development would not be consistent with current Livingston General Plan and zoning designations for commercial development, which does not allow for the high-density residential development proposed by the project. The project applicant intends to apply for a General Plan Amendment and a rezoning that would allow the residential development residential development proposed by the project. The proposed actions would not allow for development inconsistent with existing development in the area, as apartment development has occurred east of the project site. Also, as noted in a) above, by providing affordable housing for lower income residents the project would be consistent with the objectives of the City's Housing Element.

As described in Section 3.10, Hydrology and Water Quality, the project would comply with the provisions of the City's SWMP, the implementation of which is intended to avoid adverse impacts on surface water quality. This IS/MND discusses other potential project impacts that could affect City ordinances and Livingston Municipal Code provisions. The project would comply with these ordinances and provisions. Project impacts would be less than significant.

Environmental Justice

Environmental justice is not an issue that CEQA explicitly requires to be addressed; however, the State of California has recently emphasized the incorporation of environmental justice in land use and environmental planning. State law defines "environmental justice" as "the fair treatment of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." The State has enacted legislation that seeks to address the adverse environmental impacts of projects that disproportionately affect minority and/or lower-income communities, particularly those already burdened with environmental problems.

The California Office of Environmental Health Hazard Assessment has developed the California Communities Environmental Health Screening Tool (CalEnviroScreen) to identify "environmental justice" or "disadvantaged" communities. CalEnviroScreen measures pollution and population characteristics using 20 indicators such as air and drinking water quality, waste sites, toxic emissions, asthma rates, and poverty. It applies a formula to each U.S. Census tract in California to generate a score that rates the level of cumulative impacts on each area. A census tract that scores in the top 25% is considered a disadvantaged community. The project site is within Census Tract 6047000304, which includes most of the City of Livingston and some adjacent rural areas. This Census tract has a CalEnviroScreen score in the 80-85 percentile, which makes it a disadvantaged community as defined by State law. The tract, the population of which is 73% Hispanic and 16% Asian American, had high indicator scores related to $PM_{2.5}$, pesticides, drinking water, and ozone pollution. Unemployment, education, and linguistic isolation also were issues of concern (OEHHA 2021).

The project proposes construction in a developing area of Livingston. The project would not contribute to the issues that have high indicator scores pertaining to Census Tract

6047000304, except for $PM_{2.5}$ and ozone pollution. As discussed in Section 3.3, Air Quality, the project would generate ozone precursors at levels below SJVAPCD significance thresholds. $PM_{2.5}$ would be generated mainly during project construction, and compliance with SJVAPCD rules and regulations on dust control would reduce $PM_{2.5}$ impacts to a level that would be less than significant.

It should be noted that the project is intended to provide housing for City households with low incomes. Moreover, this housing would be located near an elementary school, medical offices, and retail stores, which would reduce the need for apartment residents to use a car with its attendant environmental impacts. Therefore, the project would not have significant impacts related to environmental justice, and it may have beneficial impacts.

3.12 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				✓

NARRATIVE DISCUSSION

Environmental Setting

The City of Livingston has not identified any mineral resources on the project site. The California Division of Mines and Geology, now part of the California Geological Survey, has classified portions of the state into Mineral Resource Zones. The project site and vicinity were not classified as being in a Mineral Resource Zone that designates resources of value (California Geological Survey 1999). There are no active oil or natural gas fields in the project vicinity (DOGGR 2001).

Environmental Impacts and Mitigation Measures

a, b) Availability of Mineral Resources.

There are no identified mineral resources areas on the project site. The project would have no effect on the availability of or access to locally designated or known mineral resources. The project would have no impact on mineral resources.

3.13 NOISE

Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			✓	
b) Generation of excessive groundborne vibration or groundborne noise levels?			✓	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓

NARRATIVE DISCUSSION

Environmental Setting

Noise Background

Noise is often described as unwanted sound. To provide a manageable way to measure sound, the decibel (dB) scale was devised. The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by the A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives noise.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state, A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} shows very good correlation with community response to noise, and it is the basis for other noise descriptors such as the Day-Night Average Level (L_{dn}). The L_{dn} is based upon the average hourly L_{eq} over a 24-hour day, with a 10-dB weighting applied to noise during the hours between 10:00 p.m. and 7:00 a.m. to account for greater sensitivity during that period.

J.C. Brennan and Associates conducted a noise study for the project. Appendix E contains the noise study. The noise environment at the project site and vicinity is defined by roadway traffic and railroad operations. B Street is adjacent to the project site, while SR 99 is north of the site. Beyond SR 99 to the north are the Union Pacific Railroad tracks. Industrial uses were also identified north of SR 99; however, noise from these uses was not a contributing factor to the overall measured noise levels at the project site. Noise levels measurements taken at the project site, which focused mainly on noise generated by SR 99 traffic, indicated that ambient noise levels ranged from 54.6 to 55.1 dB L_{eq}, with a maximum noise level registered at 62.0 dB.

The Noise Element of the Livingston General Plan establishes noise standards applicable to projects. Residences shall not be exposed to noise from transportation sources at levels that exceed 65 dB L_{dn} in outdoor activity areas of these facilities. Interior noise levels within these facilities shall not exceed 45 dB L_{dn}. New development of noise-sensitive land uses shall not be permitted in areas exposed to existing or projected future levels of noise from transportation noise sources which exceed these specified noise levels.

The CEQA Guidelines define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas." While CEQA does not define what a substantial increase would be, research on an individual's reaction to changes in noise indicate that a 3-dB change in noise levels is considered barely perceptible to the human ear, while an increase by 5 dB is a clearly perceptible change. For this project, a 5-dB increase in noise levels due to the project would be considered a significant impact.

Environmental Impacts and Mitigation Measures

a) Exposure to Noise Exceeding Local Standards.

Traffic Noise

The project would result in a permanent increase in ambient noise levels over existing conditions, as the site is currently vacant. Noise would be generated mainly by traffic to and from the apartment complex.

The noise levels generated by traffic on B Street and SR 99 were estimated using the Highway Traffic Noise Prediction Model developed by the Federal Highway Administration. The model generates noise contours based on daily traffic, distances from the roadway, and traffic speeds. For this project, estimated daily traffic volumes were provided by the project traffic study (see Section 3.17, Transportation and Appendix F). The model results, available in Appendix E, estimated that the project site would be exposed to traffic noise levels from both roadways of 60 dB L_{dn} under Existing Plus Project conditions and 62 dB L_{dn} under the worst-case cumulative scenario (no Winton Parkway extension to F Street).

The primary traffic noise source at the project site is SR 99. The predicted traffic noise level under cumulative conditions is 62 dB Ldn at the nearest building facades. This is less than the maximum 65-dB exterior noise level exposure allowed for residences under the Livingston General Plan. Traffic noise levels along B Street would be lower. Therefore, exposure to exterior noise from SR 99 and B Street traffic would have an impact that is less than significant.

Railroad Operations

It is assumed that future railroad noise levels will be consistent with the existing railroad operations noise level, which is 65.5 dB L_{dn}. This is a potentially significant noise source. However, based upon the project design, the community open space, patio space, and recreation areas are located within the interior of the project site. Due to shielding from the buildings, these areas would have a minimum of 8 to 10 dB reduction in noise. Therefore, the project would comply with the exterior noise level standard at the common outdoor areas. This is a less-than-significant noise impact.

Combined Traffic and Railroad Noise

The cumulative traffic and railroad noise levels at the project site would be 67.2 dB L_{dn}. Based upon the project design, the community open space, patio space, and recreation areas are located within the interior of the project site. Due to shielding from the buildings, these areas would have a minimum of 8 to 10 dB reduction in noise. Therefore, the project would comply with the exterior noise level standard at the common outdoor areas. This is a less-than-significant noise impact.

To determine if the project would achieve the interior noise level criterion of 45 dBA L_{dn}, the noise study assumed that the building construction is wood frame, with a minimum of R-19 insulation in the stud cavities and R-38 in the attic spaces. The siding is assumed to be stucco over foam board. The interior is assumed to be a 5/8" Type X gypsum board. Windows are assumed to be typical dual glazed windows, which have a typical STC rating of approximately 26. Typical construction would result in an exterior to interior noise level reduction of 25 dBA, if air conditioning is provided to allow residents to close windows and doors for the proper acoustical isolation. The noise study assumed that the first row of residences would experience traffic and railroad noise levels of no more than 70 dBA L_{dn}. Based on this, interior noise levels are expected to comply with the interior noise level standard of 45 dBA Ldn. This is a less-than-significant noise impact.

Project Construction

Construction of the proposed project would involve temporary increases in ambient noise levels, due to the use of construction equipment and vehicle traffic to and from the construction site. The noise study noted that activities involved in construction would generate maximum noise levels ranging from 76 to 88 dB at a distance of 50 feet. Although project construction noise would cease once construction work is completed, this is considered a potentially significant short-term impact, as the project site is near existing residential development.

It is expected that construction activities would follow the guidelines contained in the Livingston Municipal Code as follows:

- *Section 4-6-27 – Grading Hours of Operation.* All grading in residential zones, or within one thousand feet (1,000') of any residential occupancy, hotel, motel, or hospital, shall be carried on between the hours of 8:30 a.m. and 5:30 p.m. Monday through Saturday, and 10:00 a.m. and 5:30 p.m. on holidays, unless other hours are specified by the City Engineer or the City Manager, upon receipt of evidence that an emergency exists which would constitute a hazard to persons or property.

- *Section 4-6-28 – Grading Dust and Noise Control*. All graded surfaces and materials, whether filled, excavated, transported, or stockpiled, shall be wetted, protected, or contained in such a manner as to prevent any nuisance from dust, or spillage upon adjoining property or streets. Equipment and materials on the site should be used in such a manner as to avoid excessive dust and noise. Roadways on the site shall be surfaced or wetted sufficiently to prevent excessive dust.

Compliance with these provisions of the Livingston Municipal Code would reduce construction noise impacts on nearby residences to a level that would be less than significant.

Project Site Activities

Activities on the project site, particularly in the residential units, could potentially disturb residents to the east of the site. Livingston Municipal Code Section 10-7-2 states that it shall be unlawful to conduct or allow to be conducted any party where there is loud and unreasonable noise between the hours of 10:00 p.m. and 6:00 a.m., if such noise is sufficiently loud and unreasonable in volume level, duration, and character to maliciously and willfully disturb the comfort, health, peace, safety, or repose of reasonable persons of ordinary sensibilities. Continuation of an activity prohibited by this section after notification by a peace officer that the activity is disturbing the peace shall be prima facie evidence of malicious and willful intent. Enforcement of this provision would ensure that noise generated by project site activities would reduce noise impacts on nearby residences to a level that would be less than significant.

b) Exposure to Groundborne Vibration or Noise.

Groundborne vibration is not a common environmental problem. It is typically associated with transportation facilities, although it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving, and operating heavy earth-moving equipment. Caltrans has developed standards that show the vibration levels normally required to result in damage to structures, presented in terms of peak particle velocity in inches per second (see noise study in Appendix E). The threshold for architectural damage to structures is 0.20 inches per second peak particle velocity.

The noise study evaluated the potential impacts from primary vibration-generating activities associated with the project, which would occur when the infrastructure such as grading, utilities, and parking lots are constructed. Sensitive receptors are generally a minimum of 50 feet from the construction site. Construction activities would produce peak particle velocities of less than 0.09 inches per second at a distance of 25 feet. Since this would be below the Caltrans standards for architectural damage, the construction vibration levels are not expected to result in any damage to structures. Project impacts related to groundborne vibrations would be less than significant.

c) Public Airport and Private Airstrip Noise.

As discussed in Section 3.9, Hazards and Hazardous Materials, there are no airports in Livingston or in the immediate vicinity. There are also no private airstrips in the project vicinity. The project would have no impact associated with noise from airport or airstrip operations.

3.14 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			✓	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				✓

NARRATIVE DISCUSSION

Environmental Setting

As of January 1, 2020, the population of Livingston was estimated at 15,052, an increase of 34.6% from its 2010 population as recorded by the U.S. Census Bureau. As of January 1, 2020, the City of Livingston had an estimated 3,690 housing units - an increase from 3,320 in 2010. Of the total housing units in 2020, 3,113 were single-family detached units (typical houses), approximately 84.5% of the total. Approximately 8.5% of the total housing units were multifamily units of five or more per building. The total number of such units in 2020 was 312, an increase from 263 in 2010.

The Housing Element of the General Plan and the 2014-2023 Regional Housing Needs Assessment have identified a lack of available housing throughout Merced County, including Livingston (City of Livingston 2016a). As noted in Chapter 1.0, Introduction, the average number of persons per household in Livingston is 4.22 (California Department of Finance 2020). The high number of persons per household within the city may indicate possible overcrowding and a lack of available housing.

Environmental Impacts and Mitigation Measures

a) Unplanned Population Growth.

The project would involve multifamily residential development on an approximately four-acre site. The project would create 80 new multi-family units, resulting in a potential population increase of approximately 338 people, based on the current average number of persons per household. The proposed development is currently not consistent with the Livingston General Plan, which designates the project site for commercial development. However, the project would be consistent with the projected need for lower-income housing described in the Housing Element of the Livingston General Plan (City of Livingston 2016a). The lower-income housing need is based largely on the projected population growth in Livingston. It should be noted that the Livingston General Plan is currently undergoing an update.

The project would provide employment opportunities in Livingston during its construction, which may attract people from outside the Livingston area. However, these opportunities would be limited in number and would most likely be met from the existing population in the Livingston area. Project impacts on unplanned population growth would be less than significant.

b) Displacement of Housing or People.

The project site is currently vacant and has no structures, residential or otherwise. Therefore, the project would not displace housing or people. The project would have no impact on displacement of people or housing.

3.15 PUBLIC SERVICES

Would the project:

a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
i) Fire protection?			✓	
ii) Police protection?			✓	
iii) Schools?			✓	
iv) Parks?			✓	
v) Other public facilities?			✓	

NARRATIVE DISCUSSION

Environmental Setting

Fire Protection

Fire protection, rescue, and emergency medical response service are provided by the Livingston Fire Department. The Livingston Fire Department is managed through a contractual agreement with Merced County. The agreement consists of staffing for one California Department of Forestry and Fire Protection (Cal Fire) full-time position and 15 volunteer members 24 hours a day, 7 days a week in the City (City of Livingston 2018). The County Fire Department maintains Station 96 on 1430 C Street in downtown Livingston, less than one-half mile from the project site. Station 96 has one Type 2 fire engine, and one Type 1 water tender (Merced County Fire Department 2019).

In a January 2019 comment on a proposed commercial development in Livingston, the Fire Department stated that the project and additional ongoing development in the City would result in significant impacts on the Department, including increases in emergency call response times as well as the need for additional staffing and equipment, which the Fire Department considers inadequate. At the time, the Fire Department stated that the City's growth had outpaced the Department's size and capabilities. The City addressed increasing fire protection demands in its adopted Municipal Services Review, acknowledging that additional and fire stations may be required (City of Livingston 2018).

To respond to this need, the City adopted its 2018 Consolidated Community Facility District. New development projects are required to annex into the District as a condition of approval. Fees raised through the District will be used to meet costs of needed Fire Department and other City facilities that may be required throughout the City, including additional fire control equipment and a new fire station (Hatch pers. comm.). In addition, the City charges mitigation fees on new development for fire protection services. These fees are used for the construction of facilities necessary to meet the future demands on fire services generated by new development. For new high-density residential development, the City charges $366 per unit.

Police Protection

Police protection services are provided by the Livingston Police Department from its station at 1446 C Street, approximately one-half mile from the project site. It is the largest General Fund department in the City, employing 20 full-time sworn and professional staff personnel as of February 2018, with one additional position anticipated to be filled. In 2005, the City adopted a policy to maintain a ratio of 1.5 officers per 1,000 residents (City of Livingston 2018).

The City has not updated or expanded the existing police facility on C Street, but there is a plan to add a second story. The funding source for this addition would need to be identified. While the City has identified department needs for the next six years, there is no updated master plan or adopted capital improvement plan (City of Livingston 2018).

The City charges mitigation fees on new development for police protection services. These fees are used for the construction of facilities necessary to meet the future demands on police services generated by new development. For new high-density residential development, the City charges $0.56 per square foot.

Schools

Elementary and middle school services (kindergarten to 8th grade) are provided by the LUSD. As of the 2019-20 school year, total enrollment in the LUSD was 2,494 students. The closest LUSD elementary school to the project site is Selma Herndon Elementary School, located behind the LUSD administrative offices on B Street across from the project site. Enrollment at this school during the 2019-20 school year was 656 students. Livingston Middle School, the only middle school in the LUSD, is located southwest of the project site. The school had an enrollment of 797 students as of the 2019-20 school year (EdData 2021).

High school services are provided by the Merced Union High School District (MUHSD). Livingston High School, part of the MUHSD and the only public high school in the City, is located at 1617 Main Street in southern Livingston. During the 2019-20 school year, enrollment at Livingston High School was 1,229 students (EdData 2021).

To assist in meeting construction costs for future facilities, both the LUSD and the MUSHD collect developer fees for industrial, commercial, and residential projects in accordance with state law. Residential developer fees for LUSD are $3.79 per square foot, while residential developer fees for MUHSD are $3.48 per square foot.

Other Public Services

The Livingston Recreation Department manages parks and recreation programs in the City. The nearest City park is Arakelian Park, approximately one-half mile south of the project site. Section 3.16, Recreation, describes City parks in more detail. Other public facilities include the Livingston branch of the Merced County Library, located at 1212 Main Street. The City charges mitigation fees on new development for municipal facilities. For residential development, the mitigation fee is $1.87 per square foot.

Environmental Impacts and Mitigation Measures

a-i) Fire Protection.

The project would generate a demand for fire protection services. As noted, the City has identified a possible need for the construction of additional fire stations. Station 96 is in a developed area with existing utility infrastructure. Because of the existing development, available area for expansion may be limited and may require removal of structures and/or pavement, which may involve potential environmental impacts. Another option would be the construction of a new fire station at another site. The City is in the process of identifying a location for a new fire station (City of Livingston 2018). Both options would be subject to CEQA review for potential environmental impacts, if required. Neither option would necessarily be triggered by development of the proposed project.

Buildings constructed as part of the project would be required to comply with the 2019 California Fire Code, recently adopted by the City. The Fire Code contain provisions designed to improve fire safety in structures, including installation of sprinkler systems, alarm systems, and portable fire extinguishers, along with requirements for hydrants and fire flows. In addition, the City has adopted provisions related to fire safety in its Fire Prevention Code (Livingston Municipal Code Title 7, Chapter 2). The project also would be subject to the City's adopted Building and Electrical Codes with their applicable provisions related to fire safety, including the installation of smoke detectors and sprinkler systems. Entryways would be constructed to City standards, which consider emergency vehicle accessibility. Compliance with these requirements would minimize fire risk to residents and buildings of the proposed project development.

While the proposed project would not necessarily require new fire facilities, new development is required by ordinance to pay Public Facility Fees to the City for future construction of Fire Department facilities that may be required elsewhere in the City, as well as fees to the 2018 Consolidated Community Facilities District. Compliance with the applicable codes and City standards, along with payment of fees, would reduce project impacts on fire protection services to a level that would be less than significant.

a-ii) Police Protection.

The project would generate a demand for police protection services. The General Plan EIR did not identify any significant impacts of future development under the General Plan on police protection services (City of Livingston 1999b). As discussed in Section 3.14, Population and Housing, the project is not expected to affect the City's population in a manner unplanned by the City. Because of this, the project is not expected to affect the officer/population ratio such that new officers would need to be hired and facilities would need to be built or expanded to accommodate them. Project demands can be served by the Livingston Police Department without new or expanded police protection facilities. While the proposed project would not necessarily require new fire facilities, new development is required by ordinance to pay mitigation fees to the City for future construction of Police Department facilities that may be required. Project impacts related to police protection services would be less than significant.

a-iii) Schools.

The proposed project is likely to house students who would attend both LUSD and MUHSD schools. Based on a student generation rate of 0.573 students per unit used in the LUSD Facilities Master Plan (LUSD 2016), the project would generate approximately 46 elementary and middle school students. Additionally, based on a student generation rate of 0.074 students per unit used in a MUHSD fee justification study (MUHSD 2017), the project would generate approximately six high school students.

In 2016, LUSD elementary schools had a total enrollment that was 102 students below total capacity, while Livingston Middle School had enrollment that was 95 students below capacity. The LUSD has not experienced any significant growth that would require the development of a new school (LUSD 2016). Existing school facilities in the City can accommodate the increase in enrollment with existing facilities or with addition of portable classroom buildings if necessary. Placement of portable classrooms would not likely have significant environmental impacts, as they would be placed on school sites that are already developed.

As of the 2016-17 school year, the MUHSD had a total capacity that exceeded current enrollment by 1,358 students, although this excess capacity was reduced to 167 students when anticipated residential development was considered (MUHSD 2017). Nevertheless, it appears that the MUHSD can accommodate the additional high school students that would be generated by the project.

The project would pay required developer fees to both LUSD and MUHSD. Under state law, payment of developer fees is considered adequate mitigation of potential environmental impacts, so project impacts on schools are considered less than significant.

a-iv, v) Parks and Other Public Facilities.

The addition of the units could result in an increase in residents who may visit parks and libraries and use other public facilities within the City. As discussed in Section 3.14, Population and Housing, the population increase resulting from the project is not expected to be significant. Therefore, additional demands on parks and other public facilities such as libraries are expected to be incremental, and no new or expanded public facilities would be required. Project impacts would be less than significant.

3.16 RECREATION

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities 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?			✓	

NARRATIVE DISCUSSION

Environmental Setting

As noted in Section 3.15, Public Services, the City manages six parks and recreational facilities. Amenities available at these facilities include picnic areas, barbeques, playgrounds, baseball and soccer fields, a volleyball area, and a stage. The nearest recreational facility to the project site is Arakelian Park, approximately one-half mile to the south. Arakelian park, approximately nine acres in size, has a playground, a baseball field, a disc golf course, picnic tables, and a covered picnic shelter that can seat 100 people and which has a large barbeque and sink.

Outside the City, McConnell State Recreation Area is on the Merced River approximately two miles northeast of the project site. This recreational area offers picnic and camping facilities. Yosemite National Park, which offers a variety of recreational lands andfacilities, is approximately 70 miles east-northeast of the project site.

The City of Livingston Park and Recreation Master Plan states that the City currently provides 3.4 acres of developed park land per 1,000 residents and 5.4 acres of undeveloped park land per 1,000 residents (City of Livingston 2007b). To assist in the acquisition and development of City parks, the City requires dedication of parkland or payment of in-lieu fees on all new residential development. For new residential development in the R-3 zone, the City charges an in-lieu fee of $332 per unit.

Environmental Impacts and Mitigation Measures

a, b) Recreational Facilities.

As noted in Section 3.14, Population and Housing, the project is expected to generate an occupancy of approximately 338 residents. This is consistent with the population growth anticipated in the Parks and Recreation Master Plan, which anticipated 1,000 additional housing units from the date of plan preparation. There were 2,449 housing units at the time of plan adoption (City of Livingston 2007b).

The residents of the proposed project would generate a demand for recreational facilities and services. However, the existing parks and recreational facilities are expected to accommodate the additional residents without causing a substantial physical deterioration of these facilities. In addition, the project applicant would be required to pay the associated in-lieu fees for future park improvements which would offset any potential impacts from increased users.

The project proposes to construct a community center that would provide some recreational amenities. This would reduce the impact on offsite facilities that may occur with the increase in localized population resulting from the project. Project impacts on recreational facilities are considered less than significant.

3.17 TRANSPORTATION

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 with or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?			✓	
c) Substantially increase hazards 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?			✓	

NARRATIVE DISCUSSION

Environmental Setting

Information for this section primarily comes from a traffic study conducted for the project by KD Anderson and Associates, Inc. Appendix F contains the traffic study, which describes existing traffic conditions in the vicinity of the project site and analyzes conditions with implementation of the project, both under Existing Plus Project and Cumulative conditions. An analysis of traffic under Cumulative conditions, with the project, is presented in Section 3.21, Mandatory Findings of Significance.

Existing Transportation Facilities and Services

Streets and Intersections

Various state highways, City of Livingston streets and Merced County roads would be used to access the project site. The project site is served by roads that connect the site with SR 99, with the City of Livingston, and with adjoining rural communities in Merced County. Streets and roads near the project site that were evaluated in the traffic study are as follows:

- *State Route 99* is the primary north-south transportation corridor through Merced County. SR 99 is a controlled-access freeway with a six-lane width southeast of Hammatt Avenue and a four-lane width from Hammatt Avenue to the Stanislaus County line. Access from the project site to SR 99 would be primarily provided via the Winton Parkway interchange, approximately one-half mile northwest of the project site. The most recent traffic count data from Caltrans (2019) indicate that SR 99 carries an average annual daily traffic volume of 60,000 to 62,000 vehicles per day and peak hour volume of 5,500 to 5,800 in the vicinity of the project site.

- *B Street* is designated an arterial street in the Circulation Element of the Livingston General Plan. B Street enters the Livingston City limits on the west as Vinewood Avenue and continues east across Winton Parkway to Main Street. Near the project site, B Street varies from a two-lane street to a four-lane facility, and street improvements generally have been made where development has occurred. The posted speed limit is 35 miles per hour (mph), and a 25-mph school zone is marked east of Briarwood Drive.

- *Briarwood Drive* is a two-lane local street that extends south from B Street in the area between Winton Parkway and Prusso Street. South of Montcliff Way, the route is named Emerald Drive and continues to Peach Avenue. The posted speed limit is 25 mph. Because Winton Parkway does not yet extend south beyond B Street, Briarwood Drive has become the primary connection between Winton Parkway and the southern Livingston area.

- *Prusso Street* is a north-south street that extends south from B Street to Peach Avenue. Prusso Street is designated a collector in the Circulation Element. On-street parking is permitted on this two-lane street and a 25-mph residential speed limit applies, but the area south of B Street is marked as a 25-mph school zone.

- *Main Street*, in combination with Livingston-Cressey Road, is the primary north-south route through central Livingston. Livingston-Cressey Road enters the community from the north and crosses SR 99 to become Main Street. Main Street continues southerly and becomes Lincoln Blvd in rural Merced County. Main Street is a two-lane roadway with on-street parking in the downtown area near the project site, and the posted speed limit is 25 mph. It is designated an arterial in the Circulation Element.

- *Winton Parkway* is designated an arterial in the Circulation Element. The Winton Parkway interchange is one of two interchanges providing the Livingston area with access to SR 99. Near the project site, Winton Parkway is a north-south roadway with two to six through travel lanes. Winton Parkway begins north of SR 99 at an intersection on Campbell Avenue and continues south across SR 99 to B Street. The posted speed limit is 40 mph near the project site. The Circulation Element notes that Winton Parkway is planned to continue as a four-lane roadway south from its current B Street terminus to Peach Avenue.

- *F Street* is an east-west street that traverses Livingston. It is located approximately one-quarter mile south of B Street. F Street originates at the Flint Avenue/Robin Avenue intersection west of Livingston and continues east across Main Street to Hammatt Avenue. This two-lane roadway is designated a collector in the Circulation Element. The posted speed limit is 25 mph west of Hammatt Avenue. The land uses along F Street west of Hammatt Avenue are primarily residential, while agricultural and commercial uses exist east of Hammatt Avenue. Based on the peak hour volume collected for the traffic study, the daily traffic volume west of Hammatt Avenue is estimated to be 3,850 ADT.

The quality of flow of traffic is typically governed by the operation of intersections. The operation of the following seven existing intersections was analyzed for this study:

- Winton Parkway & SR 99 Northbound Ramps
- Winton Parkway & SR 99 Southbound Ramps
- Winton Parkway & Joseph Gallo Drive
- Winton Parkway/B Street
- B Street/Briarwood Drive
- B Street/Prusso Street
- B Street/Main Street

Existing Traffic Conditions

To quantify existing traffic conditions, a.m. and p.m. peak hour traffic count data were collected at the seven intersections evaluated in the traffic study, and LOS was determined. LOS is a quantitative measure of traffic operating conditions using a letter grade A through F, with each grade representing progressively worsening traffic conditions. The City has designated LOS C as the minimum desirable LOS at which arterial streets and collector streets should operate. Caltrans generally strives to maintain LOS C at its facilities, but it recognizes that circumstances may limit its ability to do so.

In accordance with SB 743 (see below), VMT is used to analyze transportation impacts of a project, rather than LOS. Nevertheless, the LOS at the study intersections is provided for the purpose of illustrating existing traffic conditions.

Because the COVID-19 pandemic has altered local and regional travel patterns since early 2020, it is impractical to assume that any new traffic counts would represent “typical” conditions. In response, Caltrans has required analysis of “pre-COVID” conditions. Available peak hour intersection turning movement count data provided by the City of Livingston was reviewed and supplemented with new data to create the baseline condition. The most recent traffic count data for the project site area were assembled from the analysis of the Livingston Community Health Medical Campus project in 2016. Because data were not available from that analysis for the B Street/Briarwood Drive and B Street/Prusso Street intersections, new peak hour traffic counts were made at those locations on March 17, 2021. The available data were adjusted to non-COVID current conditions to address the effects of current travel restrictions and growth that has occurred in Livingston since 2016. The traffic study in Appendix F describes the adjustments.

Table 3-5 shows the LOS under existing conditions at the seven study intersections. As shown in Table 3-5, two of the seven study intersections currently operate at acceptable LOS during both the a.m. and p.m. peak hours. Both Winton Parkway/SR 99 ramp intersections operate at an unacceptable LOS during the a.m. and p.m. peak hours under Caltrans standards. LOS E and D are considered unacceptable. The Winton Parkway/Joseph Gallo Drive intersection operates at an unacceptable LOS during the p.m. peak hour under City standards. The B Street/Briarwood Drive and B Street/Prusso Street intersections both operate at an unacceptable LOS during the a.m. peak hour under City standards.

TABLE 3-5
LOS AT STUDY INTERSECTIONS – EXISTING CONDITIONS AND EXISTING PLUS PROJECT CONDITIONS

Intersection	Existing LOS		Existing Plus Project LOS	
	AM Peak Hour	**PM Peak Hour**	**AM Peak Hour**	**PM Peak Hour**
Winton Parkway/SR 99 NB ramps	**D**	**D**	**D**	**D**
Winton Parkway/SR 99 SB ramps	**F**	**F**	**F**	**F**
Winton Parkway/Joseph Gallo Drive	C	**D**	C	**D**
Winton Parkway/B Street	B	B	B	B
B Street/Briarwood Drive	**F**	B	**F**	B
B Street/Prusso Street	**F**	B	**F**	B
B Street/Main Street	A	B	A	B
B Street/West Access (southbound approach)	-	-	C	B
B Street/East Access (southbound approach)	-	-	C	B

Note: **Bold** values indicate unacceptable LOS per City or Caltrans standards.
Source: KD Anderson 2021.

The traffic study identified the following improvements that would allow all intersections to operate at an acceptable LOS:

- The Livingston Community Health Medical Campus traffic study suggested that traffic signals be installed at the SR 99 ramp intersections. Traffic signals would yield LOS satisfying the City's minimum LOS standard with adequate queueing. Alternatively, roundabouts could be installed at the SR 99 ramp intersections and would deliver adequate LOS while reducing turn-lane queues. However, the feasibility of constructing roundabouts that can accommodate truck turning requirements without reconstructing the overcrossing is unknown. This improvement is consistent with the improvement identified in the RTP.

- Extending Winton Parkway to F Street would provide an alternative route to southern Livingston in lieu of using Briarwood Drive, Prusso Street and Main Street. This improvement is consistent with the one identified in the Livingston General Plan. Conditions at the B Street/Briarwood Drive intersection could improve substantially, but while overall delays could be reduced, peak period congestion would likely remain at the B Street/Prusso Street intersection due to school traffic.

Existing Plus Project Traffic Conditions

Traffic volumes associated with the proposed project were superimposed onto current background traffic to create the Existing Plus Project condition for a.m. and p.m. peak hour traffic volumes. Resulting Existing Plus Project peak hour LOS are presented in Table 3-5 above. The addition of project-generated traffic results in incrementally longer delays at the study intersections, but it does not result in any additional location operating with a Level of Service that exceeds the City's minimum LOS C standard. Also, the LOS at the two access points to the project site would be acceptable under City standards. The same improvements identified to achieve LOS C for existing conditions remain needed under Existing Plus Project conditions.

Public Transportation

Public transportation services in Livingston are provided by The Bus, overseen by the Transit Joint Powers Authority for Merced County and managed through MCAG. The Bus operates the Livingston Commuter route (L Line) that connects Livingston with Merced via Winton and Atwater. The Turlock Commuter route (T Line) between Merced and Turlock in Stanislaus County also passes through Livingston. Both lines pass by the project site along B Street. A stop on the L line is available at the Rancho San Miguel market west of the project site, and a stop on the T Line is available at the Walnut Avenue/Francis Street intersection. Dial-A-Ride service is available for senior citizens, the handicapped, or those without a regularly scheduled fixed route bus operating within one mile of their residence.

Bicycle and Pedestrian Facilities

The City of Livingston has a limited number of bicycle routes in general. A bike lane is striped on the south side of B Street between Winton Parkway and Briarwood Drive and on the north side of B Street along the limits of the Livingston Commons Shopping Center west of the project site. There are no designated bikeways along B Street at or in the immediate vicinity of the project site.

Concrete sidewalks exist at various locations along most City of Livingston streets, but they become less prevalent in outlying areas of the community or where development has not yet occurred. There are sidewalks on the south side of B Street through the project site, including in front of the LUSD offices. However, sidewalks are incomplete on the north side of B Street between the project site and Winton Parkway. There are no sidewalks along the B Street frontage of the project site and to the west.

Transportation Plans and Guidelines

State CEQA Guidelines Section 15064.3

The State of California has recently added Section 15064.3 to the CEQA Guidelines, which is meant to incorporate SB 743 into CEQA analysis. SB 743 was enacted in 2013 with the intent to balance congestion management needs and the mitigation of the environmental impacts of traffic with statewide GHG emission reduction goals, mainly by developing an alternative mechanism for evaluating transportation impacts. Section 15064.3 states that VMT is the preferred method for evaluating transportation impacts, rather than the commonly used LOS. The VMT metric measures the total miles traveled by vehicles as a result of a given project. VMT accounts for the total environmental impact of transportation associated with a project, including use of non-vehicle travel modes.

While a quantitative analysis of VMT is preferred, a qualitative analysis may be used if existing models or methods are not available to estimate VMT for the project being considered. The City of Livingston currently does not have traffic impact standards based on VMT, but it is required under SB 743 to establish such standards by July 1, 2020.

The Governor's Office of Planning and Research has issued a Technical Advisory on evaluating transportation impacts using VMT. The Technical Advisory recommends several approaches in developing screening thresholds to determine significance of the transportation impacts of projects (OPR 2018).

<u>Regional Transportation Plan/Sustainable Communities Strategy</u>

MCAG adopted the current version of its RTP in 2018. The RTP seeks to ensure that the Merced County transportation system will continue to operate efficiently over the next 25 years with sufficient capacity to meet demand and with mobility options available for all of Merced County's residents. The RTP focuses on regional transportation infrastructure needs, which includes roadways, railways, airports, and pedestrian and bicycle facilities. Transportation improvements proposed near the project site that are part of the RTP include Complete Streets corridor improvements on B Street from Winton Parkway to 1st Street, roundabouts on B Street at the Briarwood Drive and Main Street intersections, and the extension of Winton Parkway from B Street to F Street (MCAG 2018b).

Part of the RTP is the Sustainable Communities Strategy (SCS), which must demonstrate an approach to how land use development and transportation can work together to meet GHG emission reduction targets for cars and light trucks. Section 3.8, Greenhouse Gas Emissions, discusses the SCS in more detail.

Environmental Impacts and Mitigation Measures

a) Conflict with Transportation Plans, Ordinances and Policies.

Development of the project would generate new vehicle trips and potentially affect traffic operations at nearby intersections. The traffic study analyzed potential traffic impacts on seven existing intersections plus the two access points that would be created by the project. The analysis was based on anticipated vehicle trips generated by the project and how these trips would be distributed on the local roadway network. The traffic study in Appendix F describes its analysis methodology in more detail.

The results of the analysis are shown in Table 3-5. As shown in Table 3-5, five of the study intersections would operate at an unacceptable LOS during the a.m. and/or p.m. peak hours. The other two study intersections and the access points would operate at an acceptable LOS. As noted, the traffic study recommends street and intersection improvements that would reduce vehicle delay at all deficient intersections and improve LOS to at least minimally acceptable levels at all but the B Street/Prusso Street intersection, which would continue to experience a.m. peak hour congestion due to school traffic. This condition would be the same without the project, and suggested improvements would reduce delays even at that intersection during the a.m. peak hour. The project would not worsen LOS, in accordance with City and Caltrans standards, with implementation of the suggested improvements, which have been identified in the City General Plan and the RTP.

The project would result in an increase in demand for public transit service. The frequency and proximity of future transit service is not known at this time and, as a result, demand for transit cannot be quantified. However, it is expected that The Bus routes can accommodate the additional passengers the project would generate. This would be consistent with the goals of the RTP, which encourage further use of public transit. Impacts on public transit are considered less than significant.

The project would result in an increase in demand for bicycle and pedestrian facilities. As noted in Chapter 2.0, Project Description, the project includes construction of sidewalks and bike lanes on the east side of Main Street along the length of the project site frontage, as well as a bike lane on a portion of the west side of Main Street. This would be consistent with the goals of the RTP. Project impacts on bicycle and pedestrian facilities would be less than significant and beneficial.

b) Conflict with CEQA Guidelines Section 15064.3(b).

As discussed above, VMT is now the preferred method for evaluating transportation impacts, rather than LOS. The City currently does not have traffic impact standards based on VMT. Therefore, guidance provided by the OPR Technical Advisory is used for this analysis.

The OPR Technical Advisory identifies screening criteria that can be used to determine whether sufficient evidence exists to presume a project will have a less-than-significant VMT impact without conducting a detailed study. Each project should be evaluated against the evidence supporting that screening criteria to determine if it applies. Projects meeting at least one of the criteria below can be presumed to have a less-than-significant VMT impact, absent substantial evidence that the project will lead to a significant impact:

- ***Small Projects:*** Defined as a project that generates 110 or fewer average daily vehicle trips. The project is projected to generate 586 daily vehicle trips; therefore, it does not meet this criterion.

- ***Local Serving Retail*:** Defined as retail uses of 50,000 square feet or less can be presumed to have a less-than-significant impact. As the project is not a retail project, this criterion does not apply.

- ***Projects in Low VMT-Generating Area:*** Defined as a residential or office project that is in a VMT-efficient area based on an available VMT estimation tool. The project must be consistent in size and land use type (i.e., density, mix of uses, transit accessibility, etc.) as the surrounding built environment. As neither the City nor Merced County have yet identified such locations, this criterion does not apply.

- ***Proximity to High Quality Transit:*** Employment and residential development located within one-half mile of a high-quality transit corridor can be presumed to have a less-than-significant impact. While The Bus service is available in the vicinity of the project, the current transit service does not meet the OPR definition of "high quality transit**,**" which requires service on 15-minute headways. Therefore, this criterion is not applicable.

- ***Affordable Housing:*** Defined as a project consisting of deed-restricted affordable housing. OPR states that a project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT. Evidence supports a presumption of less-than-significant impact for a 100% affordable residential development in infill locations (OPR 2018).

The proposed project is designated an affordable housing development, with 100% of its units affordable to very-low income households. Based on OPR guidance, project impacts based on VMT is less than significant. This conclusion is supported by the project's proximity to retail services and schools, as well as the location of existing transit services. Therefore, the project would not conflict with CEQA Guidelines Section 15064.3(b), and impacts would be less than significant.

c) Transportation Hazards.

The project site is located along B Street, which currently has no improvements along the site frontage. As described in Chapter 2.0, Project Description, the B Street frontage would be improved with curb, gutter, and sidewalk in accordance with City standards and specifications. The improvements would include two driveways that would allow vehicles to enter the project site without queuing on B Street. Traffic generated by the project would be mostly passenger vehicles, similar in composition to current traffic on B Street. Vehicles that could affect traffic flow, such as farm equipment, would not be generated by the project.

B Street is currently a two-lane street along the project site frontage. Vehicles turning from B Street to the project site, particularly from the eastbound direction, could cause traffic backup and even accidents. This is of particular concern for this segment of B Street, as it is in front of the LUSD offices and near Selma Herndon Elementary School. Mitigation presented below would address the potential safety issue associated with turns from B Street to the project site, thereby reducing impacts to a level that would be less than significant.

As noted in Section 3.15, Public Services, the project would likely generate additional elementary school students. These students would most likely attend Selma Herndon Elementary School, across B Street from the project site. It is likely that many of these students would walk to the school, which would mean they would have to cross B Street. Since B Street is one the busier traffic streets in the City, crossing B Street could present a potential hazard to students. A crosswalk is currently available at the intersection of B Street and Prusso Street near the project site. Warning lights alerting traffic to this crosswalk have been installed, and crosswalk guards are there mornings and afternoons on school days (Zamora, pers. comm.). In addition, the project would construct a sidewalk along the B Street frontage, which would provide a pedestrian facility for students to use to get to the existing crosswalk. Nevertheless, by contributing additional students in the vicinity of the school, the project could have potential impacts related to pedestrian safety. Mitigation presented below would address the potential safety issue associated with turns from B Street to the project site, thereby reducing impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

TRANS-1: The project applicant shall meet with the City Engineer and City Planner, along with a representative of the Livingston Union School District, to evaluate the need for parking and pedestrian facilities in the vicinity of the project site, such as turn pockets and additional crosswalks. Should it be determined that such additional facilities would be necessary, they shall be made a condition of approval for the project, and the project applicant shall pay fair-share costs for the installation of these facilities. The City shall determine fair-share costs.

Significance After Mitigation: Less than significant

d) Emergency Access.

As described in Chapter 2.0, Project Description, the project would have two driveways accessible to emergency vehicles only, in addition to the main entrances. Also, as noted in c) above, the project would improve the B Street frontage, which would make emergency vehicle trips to and from the project site safer and more accessible. Project impacts related to emergency access would be less than significant.

3.18 TRIBAL CULTURAL RESOURCES

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:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) 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				✓
b) 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 Resources Code Section 5024.1, the lead agency shall consider the				✓

significance of the resource to a California Native American tribe.				

NARRATIVE DISCUSSION

Environmental Setting

In 2004, the California Legislature enacted SB 18, which requires local governments to consult with tribes on potential cultural resource impacts when a general plan or a specific plan is adopted or amended, or when an open space area is designated. This project proposes a General Plan Amendment, so SB 18 potentially applies. However, SB 18 addresses land use planning, not CEQA environmental review.

In 2014, the California Legislature enacted AB 52, which focuses on CEQA consultation with Native American tribes on projects potentially affecting the tribes. The intent of this consultation is to avoid or mitigate potential impacts on "tribal cultural resources," which are defined as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe."

Under AB 52, when a tribe requests consultation with a CEQA lead agency on projects within its traditionally and culturally affiliated geographical area, the lead agency must provide the tribe with notice of a proposed project within 14 days of a project application being deemed complete or when the lead agency decides to undertake the project, if it is the agency's own project. The tribe has up to 30 days to respond to the notice and request consultation; if consultation is requested, then the local agency has up to 30 days to initiate consultation.

Matters which may be subjects of AB 52 consultation include the type of CEQA environmental review necessary, the significance of tribal cultural resources, and project alternatives or appropriate measures for preservation or mitigation of the tribal cultural resource that the tribe may recommend to the lead agency. The consultation process ends when either (1) the resource in question is not considered significant, (2) the parties agree to mitigate or avoid a significant effect on a tribal cultural resource, or (3) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. Regardless of the outcome, a lead agency is still obligated under CEQA to mitigate for any significant environmental effects, as explicitly noted in AB 52.

Environmental Impacts and Mitigation Measures

a, b) Tribal Cultural Resources.

Local tribes that have been identified with the Livingston area include various Miwok and Costanoan tribes and the Northern Valley Yokuts. However, Livingston has not been identified as an area of interest by any tribe for consultation (Hatch, electronic mail, November 13, 2019). Since no tribe has requested to be consulted by the City on projects, AB 52 consultation will not occur. Because Livingston has not been identified as an area of interest by any tribe, it is unlikely that SB 18 consultation will be required. RANDY, PROVIDE RESOLUTION AS TO TREATMENT OF SB 18.

As noted in Section 3.5, Cultural Resources, no archaeological resources have been recorded on or near the project site. Project construction could potentially uncover previously unknown archaeological resources, including those of Native American origin. Mitigation Measure CULT-1 would require construction work to stop at an uncovered resource site under an archaeologist can evaluate the resource and give recommendations for its disposition. Mitigation Measure CULT-2 sets procedures for the treatment of any Native American remains that may be uncovered during project construction. Implementation of these mitigation measures would reduce potential impacts on tribal cultural resources to a level that would be less than significant.

3.19 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 would 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?			✓	

NARRATIVE DISCUSSION

Environmental Setting

Wastewater

The City of Livingston collects and treats wastewater generated by City residents and businesses. The City's wastewater collection system consists of 29 miles of sewer lines ranging in diameter from 6 to 27 inches (City of Livingston 2018). As noted in Chapter 2.0, Project Description, there is a 27-inch diameter sewer line beneath B Street.

The collected wastewater is conveyed to the Domestic Wastewater Treatment Plant at Vinewood Avenue and Washington Boulevard northwest of Livingston. The average wastewater flow into the treatment plant is 1.06 million gallons per day (mgd). The Domestic Wastewater Treatment Plant currently has sufficient capacity to treat an average wastewater flow of 2.0 mgd average (City of Livingston website).

Potable Water

The City provides potable water to residential, commercial, industrial, and institutional customers. As noted in Section 3.10, Hydrology and Water Quality, the City obtains its water from local aquifers through eight wells. Until recently, the City wells had individual production capacities described as ranging from 970 to 1,140 gallons per minute. As of 2008, City wells had a supply capacity of approximately 10.8 mgd. In 2005, the City produced approximately 5.8 mgd of water. The City recently added a new groundwater well to its system, Well No. 17; the well's production capacity of 2,000 gallons per minute represents an addition of approximately 2.9 mgd to the City's water production capacity (City of Livingston 2016b).

The City's water system also includes a storage tank with a capacity of one million gallons and more than 36 miles of pressurized water lines ranging in diameter from 2 to 16 inches. As noted in Chapter 2.0, Project Description, a water line 12 inches in diameter is located beneath B Street along the project site frontage.

Storm Drainage

Storm drainage generated in the developed areas of the City are collected by a municipal system composed of underground storm drains, detention and percolation basins, and discharges into MID canals and laterals via pump stations. As noted, storm drainage generated by the project either would be collected in an onsite retention basin or would be sent to the City's storm drainage system via connection to facilities on Briarwood Drive.

As noted in Section 3.10, Hydrology and Water Quality, the City has an adopted SWMP, developed in compliance with the federal NPDES program and with the SWRCB's MS4 General Permit. The SWMP requires preparation of a construction Storm Water Pollution Prevention Plan and incorporation of post-construction BMPs into the project in order to protect water quality. The on-site storm drainage system would be required to conform to the adopted SWMP, subject to the approval of the City Engineer.

Solid Waste

Solid waste is collected in Livingston by Gilton Solid Waste Management, Inc., under contract with the City. On average, approximately 1,097 tons of solid waste is collected in Livingston per month. Solid waste collected in Livingston is transported to one of two landfills in Merced County. The Billy Wright Landfill, approximately one mile west of Interstate 5 near Los Banos, has a maximum permitted disposal capacity of 14,800,000 cubic yards. As of September 30, 2010, this landfill had a remaining capacity of 11,370,000 cubic yards (CalRecycle 2018a). The Highway 59 Landfill, along SR 59 approximately six miles north of Merced, has a maximum permitted disposal capacity of 30,012,352 cubic yards. As of September 1, 2005 – the latest date for which information was available – this landfill had a remaining capacity of 28,025,334 cubic yards (CalRecycle 2018b).

Other Utilities

Energy and telecommunication utilities regulated by the State serve the City. All State-regulated utilities are obligated to extend services to new development sites, as necessary.

Electricity to the City is provided by MID. Electricity from MID is generated by the McSwain and New Exchequer Dams in Mariposa County. MID serves more than 3,000 customers and has signed contracts for more than 9,000 new residential units. MID has constructed a substation near Livingston that delivers electricity to customers in the Livingston area through a local distribution system. While MID provides electricity, PG&E is responsible for the maintenance of the distribution system (Merced County 2013c). A PG&E 12-kilovolt distribution line is located along the eastern boundary of the project site.

PG&E provides all the natural gas services in Merced County. It owns an 8-inch diameter gas pipeline that runs parallel to SR 99 through Merced County (Merced County 2013c). Most of the City of Livingston is served by natural gas pipelines. A transmission pipeline is located beneath B Street adjacent to the project site.

Telephone services are provided by AT&T and by various cellular telephone companies. Cable television service is provided by Spectrum (formerly Charter). An existing Spectrum cable line is located west of the project site. All these companies, along with others, provide Internet access.

Environmental Impacts and Mitigation Measures

a) Relocation or Construction of New Facilities.

The project would connect to existing water, sewer, electricity, natural gas, and cable television lines in the immediate project vicinity. No new substantial utility facilities would need to be constructed or relocated to provide these services. Existing utility poles on the project site would be relocated or removed, and lines attached to these poles would be undergrounded or relocated. The relocation of these lines would occur in an area that already has substantial urban development, and it would not affect any sensitive habitats or resource areas.

As noted, the project proposes two options for the collection and disposal of storm drainage. One option is the construction of onsite storm drainage facilities with a retention basin. The construction of an onsite system would have the same environmental impacts on the project site as would the project as a whole. Also, as discussed in Section 3.10, Hydrology and Water Quality, the onsite system would be constructed in accordance with City standards and specifications, so as not to adversely affect water quality.

The other option would be to connect the project site to the City's storm drainage system. Although the specific facilities to be constructed under this option are not known, it is expected that an offsite facility would be required, mainly a storm drainage line connecting the project site to existing facilities at Briarwood Drive. This offsite line would likely be constructed within the existing B Street right-of-way, which has no known significant environmental resources. It is possible that unknown cultural resources could be encountered during construction of such a line; however, implementation of Mitigation Measure CULT-1 (see Section 3.5, Cultural Resources) would reduce any potential impacts to a level that would be less than significant.

In summary, facilities would need to be moved and possibly constructed. However, such relocation and construction would not have a significant environment impact with implementation of project mitigation. Project impacts related to relocation or construction of new facilities would be less than significant with mitigation.

Level of Significance: Potentially significant

Mitigation Measures: Implementation of Mitigation Measure CULT-1.

Significance after Mitigation: Less than significant

b) Water Systems and Supply.

The project would connect to the existing water line located along B Street. The existing water supply line has adequate capacity to serve the project; no new or expanded water lines beyond onsite lines would be required.

The project would place additional demand on the City's water supply. As indicated above, the City's water system had approximately 10.8 mgd of available water supply in 2008. The City's available potable water capacity was recently increased by approximately 2.9 mgd with the addition of Well 17 to the water system. It is anticipated that groundwater supplies will be sufficient to meet the needs of the City through the year 2040, even under drought conditions. The City's current water supply can accommodate the project; no new or expanded water entitlements would be required. Project impacts on water systems and supply would be less than significant.

c) Wastewater Treatment Capacity.

The project would place additional demand on the City's wastewater collection and treatment system. Based on a factor of 2,600 gallons per day per gross acre for high-density residential users (City of Livingston 2007a), the amount of wastewater that would be generated by the project would be approximately 10,348 gallons per day. As indicated above, the Domestic Wastewater Treatment Plant currently has available capacity of 2.0 mgd on average. Thus, the City's wastewater treatment system would have adequate capacity to accommodate wastewater generated by project activities at full buildout. The project would contribute to future expansion of the Domestic Wastewater Treatment Plant through the payment of sewer connection fees. Project impacts on wastewater services would be less than significant.

d, e) Solid Waste Services.

Operation of the apartments would generate solid waste materials consistent with residential land uses. The project is not anticipated to create a significant amount of solid waste. All solid waste generated during construction and operations would be removed in accordance with federal, state, and local regulations. The Highway 99 Landfill, with 93% of its capacity available, could accommodate project-generated solid waste. Project impacts would be less than significant.

3.20 WILDFIRE

If located in or near State Responsibility Areas or lands classified as Very High Fire Hazard Severity Zones, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				✓
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?				✓

NARRATIVE DISCUSSION

Environmental Setting

The Livingston General Plan states that wildland fire hazards threaten life and property within the Livingston vicinity. Wildfires are an annual hazard in Merced County. They burn natural vegetation on undeveloped lands and include rangeland, brush, and grass fires. Long, hot, and dry summers with temperatures often exceeding 100°F add to the County’s fire hazard. Human activities are the major causes of wildfires, while lightning is the main cause of the remaining wildfires. High hazard areas for wildfires in Livingston are the grass and brush-covered areas located east of the City (City of Livingston 1999a). The project site is not within these areas.

Cal Fire’s Fire and Resource Assessment Program identifies fire threat based on a combination of two factors: 1) fire frequency, or the likelihood of a given area burning, and 2) potential fire behavior (hazard). These two factors are combined in determining the following Fire Hazard Severity Zones: Moderate, High, Very High, Extreme. These zones apply to areas designated as State Responsibility Areas – areas in which the State has primary firefighting responsibility. The project site is not within a State Responsibility Area and therefore has not been placed in a Fire Hazard Severity Zone for such areas (Cal

Fire 2007a). Both the project site and surrounding area are in a Local Responsibility Area, and both areas are not in any designated fire hazard severity zones (Cal Fire 2007b).

Environmental Impacts and Mitigation Measures

a) Emergency Response Plans and Emergency Evacuation Plans.

As discussed in Section 3.9, Hazards and Hazardous Materials, project construction is not expected to substantially obstruct emergency vehicles or any evacuations that may occur in the area with implementation of Mitigation Measure HAZ-1. The project would not obstruct any roadways once construction work is completed. Project impacts related to wildfire emergency response plans or emergency evacuation plans would be less than significant with mitigation.

Level of Significance: Potentially significant

Mitigation Measures: Implementation of Mitigation Measure HAZ-1.

Significance after Mitigation: Less than significant

b) Exposure of Project Occupants to Wildfire Hazards.

The project site is not part of a State Responsibility Area, and Cal Fire maps indicate the site is not designated within a Very High Fire Hazard Severity Zone or a zone of higher severity for either state or local responsibility areas. The project site is in a predominantly urban area, which is not prone to wildfires. The project would reduce the existing fire hazard on the project site by replacing existing grasses and weeds with developed area and landscaping. The project would have no impact related to exposure of project occupants to wildfire hazards.

c) Installation and Maintenance of Infrastructure.

The project proposes the installation of roads and parking areas and the extension of utilities. The installation of these facilities is not expected to exacerbate the wildfire risk on the project site, which is minimal as explained in b) above. The project would have no impact related to exacerbation of wildfire hazards by infrastructure improvements.

d) Risks from Runoff, Post-Fire Slope Instability, or Drainage Changes.

The project site is in a topographically flat area. There are no streams or other channels that cross the site. As such, it is not expected that people or structures would be exposed to significant risks from changes resulting from fires in steeper areas, including downslope or downstream flooding or landslides. The project would have no impact related to risks from runoff, post-fire slope instability, or drainage changes.

3.21 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		✓		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)			✓	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			✓	

NARRATIVE DISCUSSION

a) Findings on Biological and Cultural Resources.

The project's potential biological and cultural resource impacts were described in Sections 3.4 and 3.5, respectively. Potentially significant environmental effects were identified in both issue areas, but these effects would be reduced to levels that would be less than significant with implementation of identified mitigation measures.

b) Findings on Individually Limited but Cumulatively Considerable Impacts.

The potential cumulative impacts of urban development of the site were accounted for in the Livingston General Plan EIR (City of Livingston 1999b). The potential environmental effects identified in this IS/MND have been considered in conjunction with each other as to their potential to generate other potentially significant effects.

As described in this IS/MND, the potential environmental effects of the project would either be less than significant or would have no impact at all. Where the project involves potentially significant effects, these effects would be avoided or reduced to a level that is less than significant with proposed mitigation measures and/or compliance with applicable regulations and conditions of required permits. The various potential environmental effects of the project would not combine to generate any potentially significant cumulative effects.

The KD Anderson traffic study evaluated cumulative baseline and cumulative plus project LOS at the study intersections. Cumulative conditions were assumed to include traffic from approved development projects, which are listed in Table 14 of the traffic study. Table 3-6 shows the LOS under both cumulative conditions. As shown in Table 3-6, only two of the nine study intersections would operate at acceptable LOS during both the a.m. and p.m. peak hours under cumulative conditions both without and with the project (B Street/Main Street and B Street/West Access). Most intersections would operate with unacceptable LOS during both peak hours under cumulative conditions without and with the project. As noted in Section 3.17, Transportation, LOS is shown here for informational purposes.

TABLE 3-6
LOS AT STUDY INTERSECTIONS – CUMULATIVE CONDITIONS

	A.M. Peak Hour LOS		**P.M. Peak Hour LOS**	
Intersection	**w/o Project**	**With Project**	**w/o Project**	**With Project**
Winton Parkway/SR 99 NB ramps	**F**	**F**	**F**	**F**
Winton Parkway/SR 99 SB ramps	**F**	**F**	**F**	**F**
Winton Parkway/Joseph Gallo Drive	**D**	**D**	**D**	**E**
Winton Parkway/B Street	**D**	**D**	**F**	**F**
B Street/Briarwood Drive	**F**	**F**	**E**	**E**
B Street/Prusso Street	**F**	**F**	**D**	**D**
B Street/Main Street	A	A	C	C
B Street/West Access (southbound approach)	-	C	-	C
B Street/East Access (southbound approach)	-	**D**	-	C

Notes: **Bold** values indicate unacceptable LOS.
Source: KD Anderson 2021.

The traffic study recommended the following improvements to improve traffic circulation in the area under cumulative conditions, and estimated fair-share costs of the project for these improvements:

- Extension of Winton Parkway to F Street
- SR 99 NB ramps: Signalize, add southbound right-turn lane on Winton Parkway.
- SR 99 SB ramps: Signalize, add a separate right-turn lane on the off-ramp.
- Restripe the butt-to-butt Winton Parkway left-turn lanes on the SR 99 overcrossing to provide 150-foot southbound left-turn lane, 120-foot common bay taper, and 250-foot northbound left-turn lane.
- Lengthen the eastbound left-turn lane at the Winton Parkway/B Street intersection to 300 feet.

- Coordinate the traffic signals from the SR 99 NB ramps to B Street.

As noted in Section 3.17, Transportation, VMT is the preferred metric to be used to evaluate the environmental impacts of a project related to transportation, rather than LOS. The impacts of the project on VMT were determined to be less than significant. Overall, the cumulative effects of the project were determined to be less than significant.

c) Findings on Adverse Effects on Human Beings.

Potential adverse effects on human beings were discussed in Section 3.7, Geology and Soils (seismic hazards); Section 3.9, Hazards and Hazardous Materials; Section 3.10, Hydrology and Water Quality (flooding); Section 3.17, Transportation (traffic hazards); and Section 3.20, Wildfire. All potential adverse effects on human beings identified in those sections would be reduced to levels that are less than significant through mitigation measure or through compliance with applicable laws, regulations, and ordinances.

4.0 REFERENCES

4.1 DOCUMENT PREPARERS

This IS/MND was prepared by BaseCamp Environmental, Inc. for use by and under the supervision of the City of Stockton Department of Community Development. The following persons were involved in preparation of the IS/MND:

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4.3 PERSONS CONSULTED

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5.0 NOTES RELATED TO EVALUATION OF ENVIRONMENTAL IMPACTS

The following notes are included in the Environmental Information Checklist shown in Appendix G of the State CEQA guidelines. The notes provide guidance as to the proper use of the form.

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 off-site as well as on-site, 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.

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 significance.

APPENDIX A
AIR QUALITY MODELING RESULTS

Tierrasanta Villas
Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Low Rise	80.00	Dwelling Unit	5.00	80,000.00	229

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	49
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - No demolition.

Architectural Coating - Per SJVAPCD Rule 4601.

Woodstoves - No fireplaces.

Area Coating - Per SJVAPCD Rule 4601.

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	150	0

tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	150	0
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	150	0
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	150	0
tblConstructionPhase	NumDays	18.00	15.00
tblConstructionPhase	NumDays	20.00	0.00
tblConstructionPhase	NumDays	8.00	5.00
tblConstructionPhase	NumDays	18.00	10.00
tblConstructionPhase	NumDays	5.00	10.00
tblFireplaces	NumberGas	44.00	0.00
tblFireplaces	NumberNoFireplace	36.00	80.00
tblOffRoadEquipment	HorsePower	231.00	226.00
tblOffRoadEquipment	HorsePower	187.00	174.00
tblOffRoadEquipment	HorsePower	130.00	125.00
tblOffRoadEquipment	HorsePower	247.00	255.00
tblOffRoadEquipment	HorsePower	247.00	255.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00

tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblWoodstoves	NumberCatalytic	5.00	0.00
tblWoodstoves	NumberNoncatalytic	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0898	0.7771	0.8574	1.7200e-003	0.0495	0.0366	0.0861	0.0130	0.0337	0.0467	0.0000	153.7835	153.7835	0.0339	0.0000	154.6302
2023	0.2768	0.2183	0.2698	5.4000e-004	0.0145	9.9100e-003	0.0244	3.8900e-003	9.1800e-003	0.0131	0.0000	47.9844	47.9844	0.0102	0.0000	48.2391
Maximum	**0.2768**	**0.7771**	**0.8574**	**1.7200e-003**	**0.0495**	**0.0366**	**0.0861**	**0.0130**	**0.0337**	**0.0467**	**0.0000**	**153.7835**	**153.7835**	**0.0339**	**0.0000**	**154.6302**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0898	0.7771	0.8574	1.7200e-003	0.0484	0.0366	0.0849	0.0128	0.0337	0.0465	0.0000	153.7834	153.7834	0.0339	0.0000	154.6301
2023	0.2768	0.2128	0.2698	5.4000e-004	0.0145	9.9100e-003	0.0244	3.8900e-003	9.1800e-003	0.0131	0.0000	47.9844	47.9844	0.0102	0.0000	48.2391
Maximum	**0.2768**	**0.7771**	**0.8574**	**1.7200e-003**	**0.0484**	**0.0366**	**0.0849**	**0.0128**	**0.0337**	**0.0465**	**0.0000**	**153.7834**	**153.7834**	**0.0339**	**0.0000**	**154.6301**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.55**	**0.00**	**0.00**	**1.81**	**0.00**	**1.05**	**0.71**	**0.00**	**0.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-3-2022	7-2-2022	0.2820	0.2820
2	7-3-2022	10-2-2022	0.2964	0.2964
3	10-3-2022	1-2-2023	0.2962	0.2962
4	1-3-2023	4-2-2023	0.3373	0.3318
5	4-3-2023	7-2-2023	0.1497	0.1497
		Highest	0.3373	0.3318

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.3554	6.8500e-003	0.5941	3.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	0.9703	0.9703	9.3000e-004	0.0000	0.9936
Energy	6.1000e-003	0.0521	0.0222	3.3000e-004		4.2100e-003	4.2100e-003		4.2100e-003	4.2100e-003	0.0000	169.2096	169.2096	6.0800e-003	2.1200e-003	169.9947
Mobile					0.4911	0.0000	0.4911	0.1205	0.0000	0.1205	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	7.4701	0.0000	7.4701	0.4415	0.0000	18.5068
Water						0.0000	0.0000		0.0000	0.0000	1.6536	11.5506	13.2043	0.1704	4.1200e-003	18.6907
Total	**0.3615**	**0.0590**	**0.6163**	**3.6000e-004**	**0.4911**	**7.5000e-003**	**0.4986**	**0.1205**	**7.5000e-003**	**0.1280**	**9.1237**	**181.7305**	**190.8542**	**0.6189**	**6.2400e-003**	**208.1859**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.3554	6.8500e-003	0.5941	3.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	0.9703	0.9703	9.3000e-004	0.0000	0.9936
Energy	6.1000e-003	0.0521	0.0222	3.3000e-004		4.2100e-003	4.2100e-003		4.2100e-003	4.2100e-003	0.0000	169.2096	169.2096	6.0800e-003	2.1200e-003	169.9947
Mobile					0.2873	0.0000	0.2873	0.0705	0.0000	0.0705	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.8675	0.0000	1.8675	0.1104	0.0000	4.6267
Water						0.0000	0.0000		0.0000	0.0000	1.3229	9.2405	10.5634	0.1363	3.2900e-003	14.9526
Total	**0.3615**	**0.0590**	**0.6163**	**3.6000e-004**	**0.2873**	**7.5000e-003**	**0.2948**	**0.0705**	**7.5000e-003**	**0.0780**	**3.1904**	**179.4204**	**182.6108**	**0.2537**	**5.4100e-003**	**190.5676**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**41.50**	**0.00**	**40.87**	**41.50**	**0.00**	**39.07**	**65.03**	**1.27**	**4.32**	**59.01**	**13.30**	**8.46**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/3/2022	4/1/2022	5	0	
2	Site Preparation	Site Preparation	4/3/2022	4/15/2022	5	10	
3	Grading	Grading	4/16/2022	4/22/2022	5	5	
4	Building Construction	Building Construction	4/23/2022	3/10/2023	5	230	
5	Paving	Paving	3/11/2023	3/24/2023	5	10	
6	Architectural Coating	Architectural Coating	3/25/2023	4/14/2023	5	15	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0

Residential Indoor: 162,000; Residential Outdoor: 54,000; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	174	0.41
Paving	Pavers	1	7.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	255	0.40
Grading	Rubber Tired Dozers	1	1.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	12.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	58.00	9.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Demolition - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Demolition - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5900e-003	0.0343	0.0332	5.0000e-005		1.8900e-003	1.8900e-003		1.7400e-003	1.7400e-003	0.0000	4.0977	4.0977	1.3300e-003	0.0000	4.1308
Total	**3.5900e-003**	**0.0343**	**0.0332**	**5.0000e-005**	**0.0000**	**1.8900e-003**	**1.8900e-003**	**0.0000**	**1.7400e-003**	**1.7400e-003**	**0.0000**	**4.0977**	**4.0977**	**1.3300e-003**	**0.0000**	**4.1308**

3.3 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	6.0000e-005	6.9000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1698	0.1698	0.0000	0.0000	0.1699
Total	**1.0000e-004**	**6.0000e-005**	**6.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1698**	**0.1698**	**0.0000**	**0.0000**	**0.1699**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5900e-003	0.0343	0.0332	5.0000e-005		1.8900e-003	1.8900e-003		1.7400e-003	1.7400e-003	0.0000	4.0977	4.0977	1.3300e-003	0.0000	4.1308
Total	**3.5900e-003**	**0.0343**	**0.0332**	**5.0000e-005**	**0.0000**	**1.8900e-003**	**1.8900e-003**	**0.0000**	**1.7400e-003**	**1.7400e-003**	**0.0000**	**4.0977**	**4.0977**	**1.3300e-003**	**0.0000**	**4.1308**

3.3 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	6.0000e-005	6.9000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1698	0.1698	0.0000	0.0000	0.1699
Total	**1.0000e-004**	**6.0000e-005**	**6.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1698**	**0.1698**	**0.0000**	**0.0000**	**0.1699**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.1200e-003	0.0000	2.1200e-003	2.3000e-004	0.0000	2.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7800e-003	0.0160	0.0197	3.0000e-005		8.4000e-004	8.4000e-004		8.0000e-004	8.0000e-004	0.0000	2.6134	2.6134	4.8000e-004	0.0000	2.6255
Total	**1.7800e-003**	**0.0160**	**0.0197**	**3.0000e-005**	**2.1200e-003**	**8.4000e-004**	**2.9600e-003**	**2.3000e-004**	**8.0000e-004**	**1.0300e-003**	**0.0000**	**2.6134**	**2.6134**	**4.8000e-004**	**0.0000**	**2.6255**

3.4 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	6.0000e-005	6.9000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1698	0.1698	0.0000	0.0000	0.1699
Total	**1.0000e-004**	**6.0000e-005**	**6.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1698**	**0.1698**	**0.0000**	**0.0000**	**0.1699**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.5000e-004	0.0000	9.5000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7800e-003	0.0160	0.0197	3.0000e-005		8.4000e-004	8.4000e-004		8.0000e-004	8.0000e-004	0.0000	2.6134	2.6134	4.8000e-004	0.0000	2.6255
Total	**1.7800e-003**	**0.0160**	**0.0197**	**3.0000e-005**	**9.5000e-004**	**8.4000e-004**	**1.7900e-003**	**1.0000e-004**	**8.0000e-004**	**9.0000e-004**	**0.0000**	**2.6134**	**2.6134**	**4.8000e-004**	**0.0000**	**2.6255**

3.4 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	6.0000e-005	6.9000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1698	0.1698	0.0000	0.0000	0.1699
Total	**1.0000e-004**	**6.0000e-005**	**6.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1698**	**0.1698**	**0.0000**	**0.0000**	**0.1699**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0614	0.6282	0.6419	1.0200e-003		0.0333	0.0333		0.0306	0.0306	0.0000	89.6391	89.6391	0.0290	0.0000	90.3639
Total	**0.0614**	**0.6282**	**0.6419**	**1.0200e-003**		**0.0333**	**0.0333**		**0.0306**	**0.0306**	**0.0000**	**89.6391**	**89.6391**	**0.0290**	**0.0000**	**90.3639**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6200e-003	0.0850	0.0169	2.3000e-004	5.3600e-003	2.4000e-004	5.6000e-003	1.5500e-003	2.3000e-004	1.7800e-003	0.0000	21.6361	21.6361	2.0500e-003	0.0000	21.6875
Worker	0.0202	0.0134	0.1443	3.9000e-004	0.0416	3.1000e-004	0.0419	0.0111	2.8000e-004	0.0114	0.0000	35.4576	35.4576	1.0000e-003	0.0000	35.4827
Total	**0.0228**	**0.0984**	**0.1612**	**6.2000e-004**	**0.0470**	**5.5000e-004**	**0.0475**	**0.0126**	**5.1000e-004**	**0.0131**	**0.0000**	**57.0937**	**57.0937**	**3.0500e-003**	**0.0000**	**57.1701**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0614	0.6282	0.6419	1.0200e-003		0.0333	0.0333		0.0306	0.0306	0.0000	89.6390	89.6390	0.0290	0.0000	90.3638
Total	**0.0614**	**0.6282**	**0.6419**	**1.0200e-003**		**0.0333**	**0.0333**		**0.0306**	**0.0306**	**0.0000**	**89.6390**	**89.6390**	**0.0290**	**0.0000**	**90.3638**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6200e-003	0.0850	0.0169	2.3000e-004	5.3600e-003	2.4000e-004	5.6000e-003	1.5500e-003	2.3000e-004	1.7800e-003	0.0000	21.6361	21.6361	2.0500e-003	0.0000	21.6875
Worker	0.0202	0.0134	0.1443	3.9000e-004	0.0416	3.1000e-004	0.0419	0.0111	2.8000e-004	0.0114	0.0000	35.4576	35.4576	1.0000e-003	0.0000	35.4827
Total	**0.0228**	**0.0984**	**0.1612**	**6.2000e-004**	**0.0470**	**5.5000e-004**	**0.0475**	**0.0126**	**5.1000e-004**	**0.0131**	**0.0000**	**57.0937**	**57.0937**	**3.0500e-003**	**0.0000**	**57.1701**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0157	0.1594	0.1769	2.8000e-004		7.9600e-003	7.9600e-003		7.3300e-003	7.3300e-003	0.0000	24.9150	24.9150	8.0600e-003	0.0000	25.1164
Total	**0.0157**	**0.1594**	**0.1769**	**2.8000e-004**		**7.9600e-003**	**7.9600e-003**		**7.3300e-003**	**7.3300e-003**	**0.0000**	**24.9150**	**24.9150**	**8.0600e-003**	**0.0000**	**25.1164**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-004	0.0182	3.8300e-003	6.0000e-005	1.4900e-003	2.0000e-005	1.5100e-003	4.3000e-004	2.0000e-005	4.5000e-004	0.0000	5.8686	5.8686	3.9000e-004	0.0000	5.8784
Worker	5.1800e-003	3.3100e-003	0.0364	1.0000e-004	0.0116	8.0000e-005	0.0117	3.0700e-003	8.0000e-005	3.1500e-003	0.0000	9.4790	9.4790	2.5000e-004	0.0000	9.4852
Total	**5.6800e-003**	**0.0215**	**0.0402**	**1.6000e-004**	**0.0131**	**1.0000e-004**	**0.0132**	**3.5000e-003**	**1.0000e-004**	**3.6000e-003**	**0.0000**	**15.3477**	**15.3477**	**6.4000e-004**	**0.0000**	**15.3637**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0157	0.1594	0.1769	2.8000e-004		7.9600e-003	7.9600e-003		7.3300e-003	7.3300e-003	0.0000	24.9149	24.9149	8.0600e-003	0.0000	25.1164
Total	**0.0157**	**0.1594**	**0.1769**	**2.8000e-004**		**7.9600e-003**	**7.9600e-003**		**7.3300e-003**	**7.3300e-003**	**0.0000**	**24.9149**	**24.9149**	**8.0600e-003**	**0.0000**	**25.1164**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-004	0.0182	3.8300e-003	6.0000e-005	1.4900e-003	2.0000e-005	1.5100e-003	4.3000e-004	2.0000e-005	4.5000e-004	0.0000	5.8686	5.8686	3.9000e-004	0.0000	5.8784
Worker	5.1800e-003	3.3100e-003	0.0364	1.0000e-004	0.0116	8.0000e-005	0.0117	3.0700e-003	8.0000e-005	3.1500e-003	0.0000	9.4790	9.4790	2.5000e-004	0.0000	9.4852
Total	**5.6800e-003**	**0.0215**	**0.0402**	**1.6000e-004**	**0.0131**	**1.0000e-004**	**0.0132**	**3.5000e-003**	**1.0000e-004**	**3.6000e-003**	**0.0000**	**15.3477**	**15.3477**	**6.4000e-004**	**0.0000**	**15.3637**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.0200e-003	0.0272	0.0346	6.0000e-005		1.3100e-003	1.3100e-003		1.2200e-003	1.2200e-003	0.0000	4.6301	4.6301	1.3500e-003	0.0000	4.6638
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.0200e-003**	**0.0272**	**0.0346**	**6.0000e-005**		**1.3100e-003**	**1.3100e-003**		**1.2200e-003**	**1.2200e-003**	**0.0000**	**4.6301**	**4.6301**	**1.3500e-003**	**0.0000**	**4.6638**

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	2.1000e-004	2.2600e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5884	0.5884	2.0000e-005	0.0000	0.5887
Total	**3.2000e-004**	**2.1000e-004**	**2.2600e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5884**	**0.5884**	**2.0000e-005**	**0.0000**	**0.5887**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.0200e-003	0.0217	0.0346	6.0000e-005		1.3100e-003	1.3100e-003		1.2200e-003	1.2200e-003	0.0000	4.6301	4.6301	1.3500e-003	0.0000	4.6638
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.0200e-003**	**0.0217**	**0.0346**	**6.0000e-005**		**1.3100e-003**	**1.3100e-003**		**1.2200e-003**	**1.2200e-003**	**0.0000**	**4.6301**	**4.6301**	**1.3500e-003**	**0.0000**	**4.6638**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	2.1000e-004	2.2600e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5884	0.5884	2.0000e-005	0.0000	0.5887
Total	**3.2000e-004**	**2.1000e-004**	**2.2600e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5884**	**0.5884**	**2.0000e-005**	**0.0000**	**0.5887**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4400e-003	9.7700e-003	0.0136	2.0000e-005		5.3000e-004	5.3000e-004		5.3000e-004	5.3000e-004	0.0000	1.9149	1.9149	1.1000e-004	0.0000	1.9178
Total	**0.2517**	**9.7700e-003**	**0.0136**	**2.0000e-005**		**5.3000e-004**	**5.3000e-004**		**5.3000e-004**	**5.3000e-004**	**0.0000**	**1.9149**	**1.9149**	**1.1000e-004**	**0.0000**	**1.9178**

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	2.1000e-004	2.2600e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5884	0.5884	2.0000e-005	0.0000	0.5887
Total	**3.2000e-004**	**2.1000e-004**	**2.2600e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5884**	**0.5884**	**2.0000e-005**	**0.0000**	**0.5887**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4400e-003	9.7700e-003	0.0136	2.0000e-005		5.3000e-004	5.3000e-004		5.3000e-004	5.3000e-004	0.0000	1.9149	1.9149	1.1000e-004	0.0000	1.9178
Total	**0.2517**	**9.7700e-003**	**0.0136**	**2.0000e-005**		**5.3000e-004**	**5.3000e-004**		**5.3000e-004**	**5.3000e-004**	**0.0000**	**1.9149**	**1.9149**	**1.1000e-004**	**0.0000**	**1.9178**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	2.1000e-004	2.2600e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5884	0.5884	2.0000e-005	0.0000	0.5887
Total	**3.2000e-004**	**2.1000e-004**	**2.2600e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5884**	**0.5884**	**2.0000e-005**	**0.0000**	**0.5887**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Increase Transit Accessibility

Integrate Below Market Rate Housing

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated					0.2873	0.0000	0.2873	0.0705	0.0000	0.0705	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated					0.4911	0.0000	0.4911	0.1205	0.0000	0.1205	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	527.20	572.80	485.60	1,537,245	899,308
Total	527.20	572.80	485.60	1,537,245	899,308

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	7.30	7.50	46.90	17.40	35.70	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.556917	0.035296	0.183646	0.120139	0.017882	0.004687	0.016156	0.056151	0.001190	0.001453	0.005055	0.000610	0.000818

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	108.8595	108.8595	4.9200e-003	1.0200e-003	109.2861
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	108.8595	108.8595	4.9200e-003	1.0200e-003	109.2861
NaturalGas Mitigated	6.1000e-003	0.0521	0.0222	3.3000e-004		4.2100e-003	4.2100e-003		4.2100e-003	4.2100e-003	0.0000	60.3500	60.3500	1.1600e-003	1.1100e-003	60.7087
NaturalGas Unmitigated	6.1000e-003	0.0521	0.0222	3.3000e-004		4.2100e-003	4.2100e-003		4.2100e-003	4.2100e-003	0.0000	60.3500	60.3500	1.1600e-003	1.1100e-003	60.7087

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	1.13092e+006	6.1000e-003	0.0521	0.0222	3.3000e-004		4.2100e-003	4.2100e-003		4.2100e-003	4.2100e-003	0.0000	60.3500	60.3500	1.1600e-003	1.1100e-003	60.7087
Total		**6.1000e-003**	**0.0521**	**0.0222**	**3.3000e-004**		**4.2100e-003**	**4.2100e-003**		**4.2100e-003**	**4.2100e-003**	**0.0000**	**60.3500**	**60.3500**	**1.1600e-003**	**1.1100e-003**	**60.7087**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	1.13092e+006	6.1000e-003	0.0521	0.0222	3.3000e-004		4.2100e-003	4.2100e-003		4.2100e-003	4.2100e-003	0.0000	60.3500	60.3500	1.1600e-003	1.1100e-003	60.7087
Total		**6.1000e-003**	**0.0521**	**0.0222**	**3.3000e-004**		**4.2100e-003**	**4.2100e-003**		**4.2100e-003**	**4.2100e-003**	**0.0000**	**60.3500**	**60.3500**	**1.1600e-003**	**1.1100e-003**	**60.7087**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	374202	108.8595	4.9200e-003	1.0200e-003	109.2861
Total		**108.8595**	**4.9200e-003**	**1.0200e-003**	**109.2861**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	374202	108.8595	4.9200e-003	1.0200e-003	109.2861
Total		**108.8595**	**4.9200e-003**	**1.0200e-003**	**109.2861**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.3554	6.8500e-003	0.5941	3.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	0.9703	0.9703	9.3000e-004	0.0000	0.9936
Unmitigated	0.3554	6.8500e-003	0.5941	3.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	0.9703	0.9703	9.3000e-004	0.0000	0.9936

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0250					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3124					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0179	6.8500e-003	0.5941	3.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	0.9703	0.9703	9.3000e-004	0.0000	0.9936
Total	**0.3554**	**6.8500e-003**	**0.5941**	**3.0000e-005**		**3.2900e-003**	**3.2900e-003**		**3.2900e-003**	**3.2900e-003**	**0.0000**	**0.9703**	**0.9703**	**9.3000e-004**	**0.0000**	**0.9936**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0250					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3124					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0179	6.8500e-003	0.5941	3.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003	0.0000	0.9703	0.9703	9.3000e-004	0.0000	0.9936
Total	**0.3554**	**6.8500e-003**	**0.5941**	**3.0000e-005**		**3.2900e-003**	**3.2900e-003**		**3.2900e-003**	**3.2900e-003**	**0.0000**	**0.9703**	**0.9703**	**9.3000e-004**	**0.0000**	**0.9936**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	10.5634	0.1363	3.2900e-003	14.9526
Unmitigated	13.2043	0.1704	4.1200e-003	18.6907

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	5.21232 / 3.28603	13.2043	0.1704	4.1200e-003	18.6907
Total		**13.2043**	**0.1704**	**4.1200e-003**	**18.6907**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	4.16986 / 2.62882	10.5634	0.1363	3.2900e-003	14.9526
Total		**10.5634**	**0.1363**	**3.2900e-003**	**14.9526**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.8675	0.1104	0.0000	4.6267
Unmitigated	7.4701	0.4415	0.0000	18.5068

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	36.8	7.4701	0.4415	0.0000	18.5068
Total		**7.4701**	**0.4415**	**0.0000**	**18.5068**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	9.2	1.8675	0.1104	0.0000	4.6267
Total		**1.8675**	**0.1104**	**0.0000**	**4.6267**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B
BIOLOGICAL RESOURCE REPORTS

CNDDB Quad Species List 15 records.

Element Type	Scientific Name	Common Name	Element Code	Federal Status	State Status	CDFW Status	CA Rare Plant Rank	Quad Code	Quad Name	Data Status	Taxonomic Sort
Animals - Birds	Accipiter cooperii	Cooper's hawk	ABNKC12040	None	None	WL	-	3712046	CRESSEY	Unprocessed	Animals - Birds - Accipitridae - Accipiter cooperii
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3712046	CRESSEY	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	3712046	CRESSEY	Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	Threatened	SSC	-	3712046	CRESSEY	Mapped	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	3712046	CRESSEY	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Lampetra hubbsi	Kern brook lamprey	AFBAA02040	None	None	SSC	-	3712046	CRESSEY	Unprocessed	Animals - Fish - Petromyzontidae - Lampetra hubbsi
Animals - Fish	Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3712046	CRESSEY	Mapped	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 11
Animals - Fish	Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3712046	CRESSEY	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 13
Animals - Insects	Desmocerus californicus dimorphus	valley elderberry longhorn beetle	IICOL48011	Threatened	None	-	-	3712046	CRESSEY	Mapped	Animals - Insects - Cerambycidae - Desmocerus californicus dimorphus
Animals - Reptiles	Gambelia sila	blunt-nosed leopard lizard	ARACF07010	Endangered	Endangered	FP	-	3712046	CRESSEY	Unprocessed	Animals - Reptiles - Crotaphytidae - Gambelia sila
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712046	CRESSEY	Mapped	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Phrynosoma blainvillii	coast horned lizard	ARACF12100	None	None	SSC	-	3712046	CRESSEY	Unprocessed	Animals - Reptiles - Phrynosomatidae - Phrynosoma blainvillii
Community - Terrestrial	Northern Hardpan Vernal Pool	Northern Hardpan Vernal Pool	CTT44110CA	None	None	-	-	3712046	CRESSEY	Mapped	Community - Terrestrial - Northern Hardpan Vernal Pool
Plants - Vascular	Castilleja campestris var. succulenta	succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	-	1B.2	3712046	CRESSEY	Mapped	Plants - Vascular - Orobanchaceae - Castilleja campestris var. succulenta
Plants - Vascular	Orcuttia inaequalis	San Joaquin Valley Orcutt grass	PMPOA4G060	Threatened	Endangered	-	1B.1	3712046	CRESSEY	Mapped	Plants - Vascular - Poaceae - Orcuttia inaequalis

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Merced County, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2873	Endangered

Reptiles

NAME	STATUS
Blunt-nosed Leopard Lizard *Gambelia silus* Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/625	Endangered
Giant Garter Snake *Thamnophis gigas* Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/2891	Threatened

California Tiger Salamander Ambystoma californiense — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/2076

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp Branchinecta lynchi Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp Lepidurus packardi Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Fleshy Owl's-clover Castilleja campestris ssp. succulenta Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/8095	Threatened
San Joaquin Orcutt Grass Orcuttia inaequalis Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/5506	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Common Yellowthroat *Geothlypis trichas sinuosa* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Nuttall's Woodpecker *Picoides nuttallii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse *Baeolophus inornatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Song Sparrow *Melospiza melodia* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Feb 20 to Sep 5
Spotted Towhee *Pipilo maculatus clementae* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/4243	Breeds Apr 15 to Jul 20
Yellow-billed Magpie *Pica nuttalli* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9726	Breeds Apr 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX C
CENTRAL CALIFORNIA INFORMATION CENTER REPORT

CENTRAL CALIFORNIA INFORMATION CENTER
California Historical Resources Information System
Department of Anthropology – California State University, Stanislaus
One University Circle, Turlock, California 95382
(209) 667-3307

Alpine, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus & Tuolumne Counties

Date: 3/10/2021

Records Search File #: 11695I
Project: Tierrasanta Villas
3.98 acres at 915 B Street,
Livingston, Merced County

Terry L. Farmer
Senior Environmental Planner
BaseCamp Environmental, Inc.
115 S. School Street, Suite 14
Lodi, CA 95240
209-224-8213 tfarmer@basecampenv.com

Invoice to: Rayanna Beck
rbeck@basecampenv.com

We have conducted a records search as per your request for the above-referenced project area located on the Cressey USGS 7.5-minute quadrangle map in Merced County.

Search of our files includes review of our maps for the specific project area and the immediate vicinity of the project area, and review of the following:

National Register of Historic Places (NRHP)
California Register of Historical Resources (CRHR)
California Inventory of Historic Resources (1976)
California Historical Landmarks
California Points of Historical Interest listing
Office of Historic Preservation Built Environment Resource Directory (BERD) and the Archaeological Determinations of Eligibility (ADOE)
Survey of Surveys (1989)
Caltrans State and Local Bridges Inventory
General Land Office Plats
Other pertinent historic data available at the CCaIC for each specific county

The following details the results of the records search:

Prehistoric or historic resources within the project area:

- No prehistoric or historic archaeological resources have been formally reported to the Information Center.
- The project is within the boundary of the proposed Merced Irrigation District (P-24-001909), but no water conveyance features that are contributors to this district are formally recorded within the project area.
- The General Land Office Survey Plats for the NE ¼ Section 26 T6S R11E (dated 1855

and 1885) do not show any historic features within Section 26 or the project area.

- The Cressey 1:31,680-scale USGS map (dated 1916) and the Cressey 7.5’ USGS quadrangle (dated 1948) do not show any historic features within the project area. The 1961 edition of the Cressey 7.5’ shows a row crop within the project area.

Prehistoric or historic resources within the immediate vicinity of the project area: None has been formally reported to the Information Center.

Resources that are known to have value to local cultural groups: None has been formally reported to the Information Center.

Previous investigations within the project area: Five documents on file refer to research that references the project area, cited below:

CCaIC Report ME-01451
Napton, L. K.
Palo Alto, Ca)
1992 *Cultural Resources Investigations of the Proposed Livingston Cogeneration Project, Merced and Stanislaus Counties, California.*

CCIC Report ME-03346
O'Connor, Denise (Caltrans District 10)
1984 *Historical Architectural Survey Report for the Livingston Freeway Project in Merced County, California, 10-MER-99, PM 26.8/32.8, 10101-043761.*

CCaIC Report ME-03354
Oman, P. (Caltrans District 10)
1984 *Attachment B: Archaeological Survey Report for the Livingston Project, A Proposed Upgrading/Realignment of Highway 99 in Merced County, 10-MER-99, P.M. 26.8/32.8, 10101-043761.*

CCaIC Report ME-03631

Quad Knopf
1999 *General Plan, Livingston, California.*

CCaIC Report ME-04620
Farquhar, F. S.
1944 *History of Livingston, California--Narrative and Biography (Excerpts).*

Recommendations/Comments: Based on existing data in our files the project area has a low sensitivity for the possible discovery of prehistoric and historic archaeological resources.

Please be advised that a historical resource is defined as a building, structure, object, prehistoric or historic archaeological site, or district possessing physical evidence of human activities over 45 years old. Since the specific project area has not been subject to previous investigations, there may be unidentified features involved in your project that are 45 years or older and considered as historical resources requiring further study and evaluation by a qualified professional of the appropriate discipline.

If the current project does not include ground disturbance, further study for archaeological resources is not recommended at this time. If ground disturbance is considered a part of the current project, we recommend further review for the possibility of identifying prehistoric or historic-era archaeological resources.

If the proposed project contains buildings or structures that meet the minimum age requirement (45 years in age or older) it is recommended that the resource/s be assessed by a professional familiar with architecture and history of the county. Review of the available historic building/structure data has included only those sources listed above and should not be considered comprehensive.

If at any time you might require the services of a qualified professional the Statewide Referral List for Historical Resources Consultants is posted for your use on the internet at http://chrisinfo.org

If archaeological resources are encountered during project-related activities**,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources.

If human remains are discovered, California Health and Safety Code Section 7050.5 requires you to protect the discovery and notify the county coroner, who will determine if the find is Native American. If the remains are recognized as Native American, the coroner shall then notify the Native American Heritage Commission (NAHC). California Public Resources Code Section 5097.98 authorizes the NAHC to appoint a Most Likely Descendant (MLD) who will make recommendations for the treatment of the discovery.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the State 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.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

We thank you for contacting this office regarding historical resource preservation. Please let us know when we can be of further service. Please sign and return the attached **Access Agreement Short Form.**

Note: Billing will be transmitted separately via email from the Financial Services office ($150.00), payable within 60 days of receipt of the invoice.

If you wish to include payment by Credit Card, you must wait to receive the official invoice from Financial Services so that you can reference the CMP # (Invoice Number), and then contact the link below:

https://commerce.cashnet.com/ANTHROPOLOGY

Sincerely,

E. A. Greathouse

E. A. Greathouse, Coordinator
Central California Information Center
California Historical Resources Information System

* Invoice Request sent to: ARBilling@csustan.edu, CSU Stanislaus Financial Services

APPENDIX D

SOIL SURVEY

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Merced Area, California

Tierrasanta

March 1, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,130 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 30, 60, 120, 180

Feet: 0, 100, 200, 400, 600

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Merced Area, California
Survey Area Data: Version 15, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 19, 2020—Apr 25, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DfA	Delhi sand, 0 to 3 percent slopes, MLRA 17	9.6	100.0%
Totals for Area of Interest		**9.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Merced Area, California

DfA—Delhi sand, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2ss8n
Elevation: 30 to 1,400 feet
Mean annual precipitation: 9 to 16 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 225 to 310 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Delhi and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delhi

Setting

Landform: Dunes on valleys
Landform position (two-dimensional): Toeslope, backslope
Landform position (three-dimensional): Rise
Microfeatures of landform position: Hummocks
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Wind modified sandy alluvium derived from granitoid

Typical profile

Ap - 0 to 8 inches: sand
C1 - 8 to 40 inches: sand
C2 - 40 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 5 percent

Hydric soil rating: No

Grangeville

Percent of map unit: 4 percent
Hydric soil rating: No

Dello

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Tujunga

Percent of map unit: 3 percent
Hydric soil rating: No

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APPENDIX E
NOISE STUDY

Tierrasanta Villas Apartments
Environmental Noise Assessment

City of Livingston, California

April 18, 2021

jcb Project # 2021-108

Prepared for:

BaseCamp Environmental

City of Livingston California

Attn:
Mr. Charlie Simpson
802 West Lodi Avenue
Lodi, CA 95240

Prepared by:

j.c. brennan & associates, Inc.

Jim Brennan, INCE
President
Member, Institute of Noise Control Engineering (INCE)

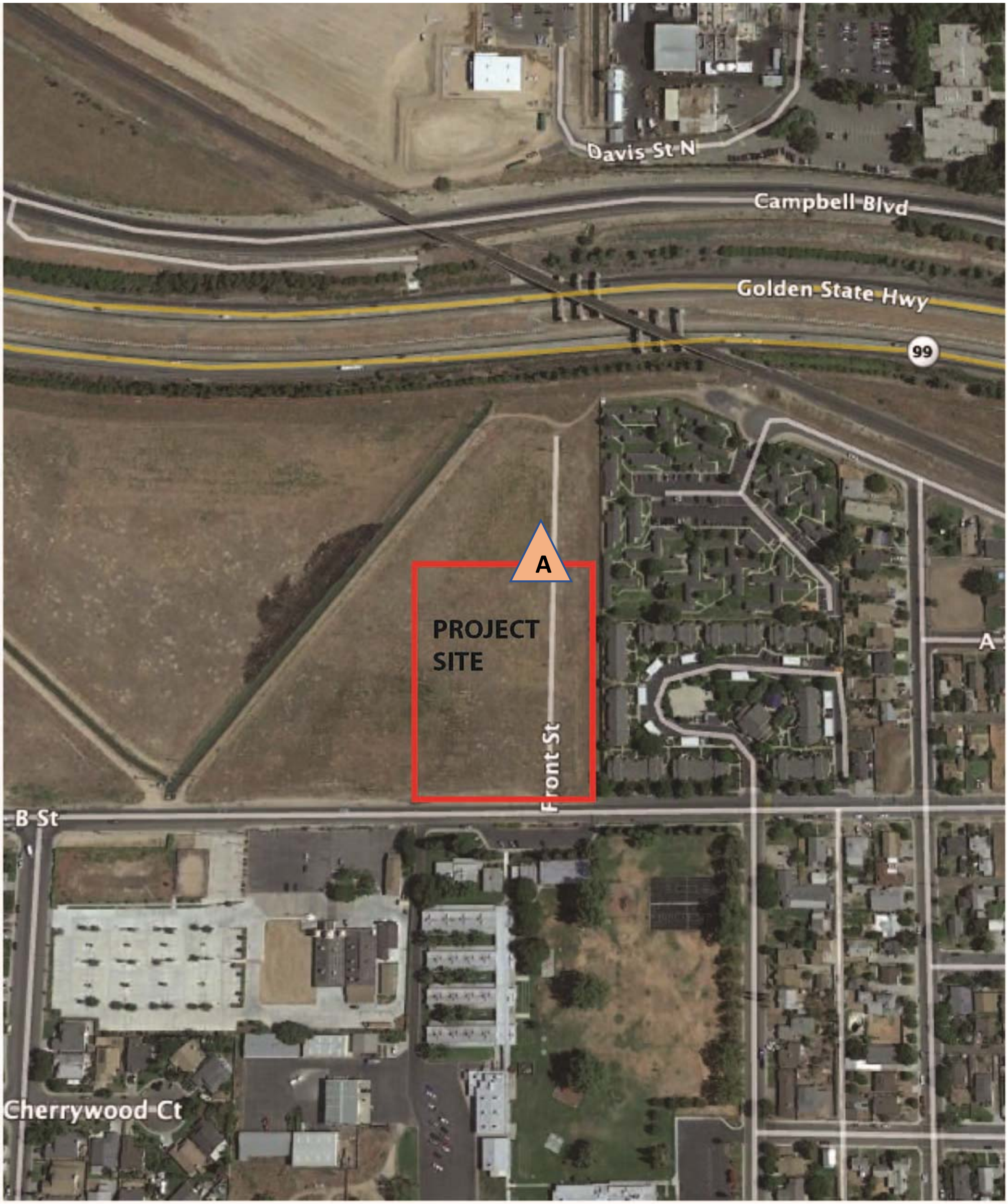
1. INTRODUCTION

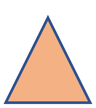
The City of Livingston has received a proposal for a multi-family residential development, known as the Terrasanta Villas Apartments. It is located north of B Street, and south of the Union Pacific Railroad (UPRR) track and State Route 99 (SR 99). The project includes a total of 80 apartment units, and a community daycare center. In addition, there are common recreation and outdoor areas located in the center of the site.

Surrounding land uses include existing residential to the east, SR 99 and the UPRR track to the north, open space to the east, and mixed uses to the south. There are industrial uses to the north and across SR 99. However, they are over 1,500 feet from the project site, and are not considered to be a major noise source.

The purpose of this noise analysis is to analyze the potential noise sources, such as traffic, railroad operations, and any commercial or industrial uses which may affect the project site. This report will also address the traffic noise levels due to the project on the local street system. In addition, the construction noise and vibration impacts are also analyzed.

Figure 1 shows the project location, and Figure 2 shows the project site plan.





Noise Monitoring Location

Figure 1 Tierrasanta Villas Apartments Project Location	
j.c. brennan & associates consultants in acoustics	*Date:* *6/15/2020*

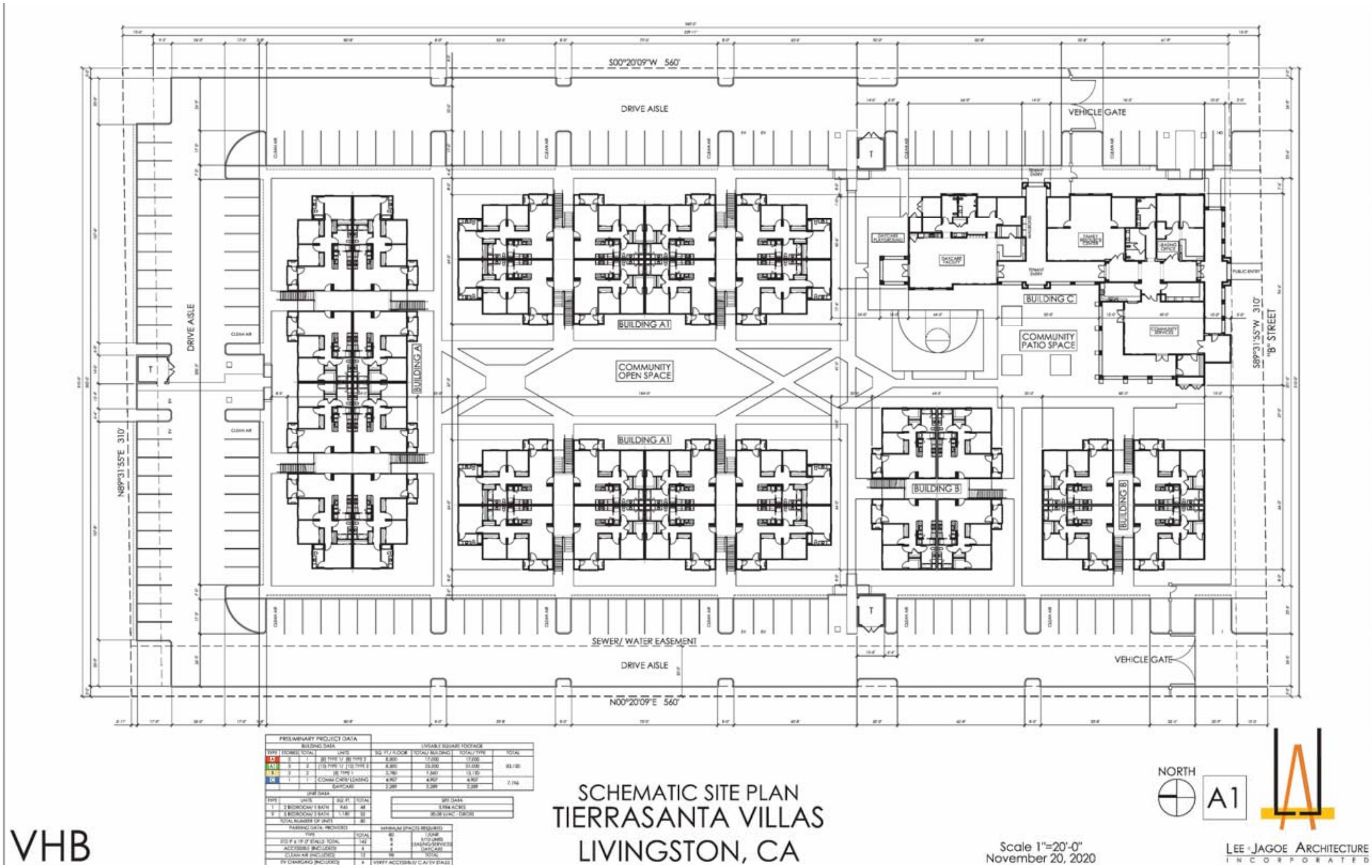


Figure 2
Tierrasanta Villas Apartments

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Rev. 1/11/17

Acoustical Terminology[1]

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective. Often, someone's music is described as noise by another.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels.

There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the

[1] For an explanation of these terms, see Appendix A: "Acoustical Terminology"

composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise. The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common noise sources. Appendix A provides a summary of acoustical terms used in this report.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.).

Table 1

LOUDNESS COMPARISON CHART (dBA)

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet Fly-over at 1000 ft	110	Rock Band
Gas Lawn Mower at 3 ft	100	
	90	Food Blender at 3 ft
Diesel Truck at 50 ft at 50 mph	80	Garbage Disposal at 3 ft
Noisy Urban Area, Daytime		
Gas Lawn Mower at 100 ft	70	Vacuum Cleaner at 10 ft
Commercial Area		Normal Speech at 3 ft
Heavy Traffic at 300 ft	60	Large Business Office
Quiet Urban, Daytime	50	Dishwasher Next Room
Quiet Urban, Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban, Nighttime		
Quiet Rural, Nighttime	30	Library
		Bedroom at Night, Concert Hall (Background)
	20	Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

An increase of 3 dBA is barely perceptible to the human ear.

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2. CRITERIA FOR ACCEPTABLE NOISE AND VIBRATION EXPOSURE

City of Livingston General Plan Noise Element Noise Level Criteria

Table 8-1 of the City of Livingston General Plan Noise Element establishes Acceptable, Conditionally Acceptable, and Conditionally Unacceptable noise level criteria for various land uses. For residential uses such as the proposed project, an Acceptable exterior noise level criterion of 65 dB Ldn has been established. A Conditionally Acceptable exterior noise level criterion of 75 dB Ldn is established, noise levels exceeding 75 dB Ldn are considered to be Conditionally Unacceptable.

Table 8-2 of the General Plan Noise Element (Table 2 of this report) provides strict guidance for the maximum allowable noise exposure due to transportation noise sources for the varying land uses.

Table 2
(Table 8-2 of the General Plan Noise Element)
Maximum Allowable Noise Exposure – Transportation Noise Sources
Transportation Noise Sources

Land Use	Outdoor Activity Areas [1] Ldn/CNEL, dBA	Interior Spaces Ldn/CNEL, dBA
Residential	65[1]	45
Hotels and Motels	65[1]	45
Hospitals, Nursing and Personal Care	65[1]	45
Churches, Meeting Halls	--	45
Schools – Preschool to Secondary, College and University, Specialized and Training, Libraries and Museums	--	45

[1] Where the location of the outdoor activity area is unknown, the exterior noise level standard shall be applied to the boundary of the planned or zoned noise-sensitive uses.

Policies

The following are policies in the General Plan Noise Element which are pertinent to this project.

1. Table 8-1 depicts the ranges of noise exposure from transportation noise sources which are considered to be acceptable, conditionally acceptable, or conditionally unacceptable for development of different land uses. Table 8-1 shall be used to determine whether mitigation is needed for development of land uses near major transportation noise sources.
2. New development o noise-sensitive land uses shall not be permitted in areas exposed to existing or projected future levels of noise from transportation noise sources which exceed the noise levels specified in Table 8-2 (*Table 2 of this report*) for any given land use.
3. Noise created by new transportation noise sources, including roadway improvement projects shall be mitigated so as not to exceed the noise levels specified in Table 8-2 (*Table 2 of this report*).
4. New development of noise-sensitive land uses shall not be permitted where the noise level due to existing stationary noise sources will exceed the noise level standards of Table 8-3 (*Table 3 of this report*).
5. New proposed stationary noise sources, or existing stationary noise sources which undergo modifications, shall not be permitted where the noise level exceeds the standards of Table 8-3 (*Table 3 of this report*).
6. The preferred method of noise control is thoughtful site design. Secondarily, noise control should be achieved through the use of noise barriers. Site and building design guidelines may include.

   (*Authors note: These are the pertinent guidelines for this project*)

   - Patios and balconies of apartments should be placed on the side of the building opposite of the noise source.
   - Two-story residential construction shall not be permitted immediately adjacent to major roadways, the railroad, or other equally significant noise sources, unless an adequate combination of noise attenuation procedures is used.

Table 3 (Table 8-3 of the General Plan Noise Element) Maximum Allowable Noise Exposure - Stationary Noise Sources		
Noise level Descriptor	Daytime (7:00 a.m. - 10:00 p.m.)	Nighttime (10:00 p.m. - 7:00 a.m.)
Hourly Leq, dB	55 dBA	50 dBA
Maximum level (Lmax), dB	75 dBA	70 dBA
As determined in outdoor activity areas. Where the location of outdoor activity areas are unknown, the noise standard shall be applied to the boundary of planned or zoned noise-sensitive uses.		

City of Livingston Municipal Code Noise Related Criteria

The following sections of the municipal code should be applied to construction noise:

4-6-27: GRADING HOURS OF OPERATION:
All grading in residential zones, or within one thousand feet (1,000') of any residential occupancy, hotel, motel, or hospital, shall be carried on between the hours of eight thirty o'clock (8:30) A.M. and five thirty o'clock (5:30) P.M. Monday through Saturday, and ten o'clock (10:00) A.M. and five thirty o'clock (5:30) P.M. on holidays, unless other hours are specified by the city engineer or the city manager, upon receipt of evidence that an emergency exists which would constitute a hazard to persons or property. (Ord. 578, 1-20-2009)

4-6-28: GRADING DUST AND NOISE CONTROL:
All graded surfaces and materials, whether filled, excavated, transported, or stockpiled, shall be wetted, protected or contained in such a manner as to prevent any nuisance from dust, or spillage upon adjoining property or streets. Equipment and materials on the site should be used in such a manner as to avoid excessive dust and noise. Roadways on the site shall be surfaced or wetted sufficiently to prevent excessive dust. (Ord. 578, 1-20-2009)

10-7-2: NOISE RESTRICTIONS; GENERAL:
It shall be unlawful to conduct or allow to be conducted any party where there is loud and unreasonable noise between the hours of ten o'clock (10:00) P.M. and six o'clock (6:00) A.M., if such noise is sufficiently loud and unreasonable in volume level, duration and character to maliciously and wilfully disturb the comfort, health, peace, safety or repose of reasonable persons of ordinary sensibilities. Continuation of an activity prohibited by this section after notification by a peace officer that the activity is disturbing the peace shall be prima facie evidence of malicious and wilful intent. (Ord. 442, 6-6-1995)

Significant Increase in Noise Level Criteria

Consistent with Appendix G of the CEQA Guidelines, the project will have a significant impact related to noise if it will result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without project;
- 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, expose people residing or working in the project area to excessive noise levels within two miles of a public airport or public use airport; or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

California Environmental Quality Act (CEQA) guidelines define a significant impact of a project if it “increases substantially the ambient noise levels for adjoining areas”. CEQA does not define what a substantial increase would be. Caltrans defines a substantial increase in noise between 10 and 12 dB. Research on an individual’s reaction to changes in noise indicate that an increase of 1 dB in noise levels is not considered to be perceptible. A 3 dB change in noise levels is considered to be barely perceptible to the human ear. Generally, an increase in noise by 5 dB is when there is a clearly perceptible change in noise levels. For this project, a 5 dB increase in noise levels due to the project will be considered a significant increase in noise.

3. SETTING

Ambient Noise Levels in the Project Vicinity

Based on field observations and noise measurement data described below, the existing noise environment at the project site is defined by roadway traffic and railroad operations. Some noise is associated with the industrial uses located across SR 99. However, the industrial noise was not a contributing factor to the overall measured noise levels.

j.c. brennan & associates, Inc. conducted short-term ambient noise level measurements on the project site on April 6, 2021 (See Figure 1 for the noise measurement location). Noise measurements were conducted absent of train activity to determine the typical noise levels associated with SR 99, and with train passbys to determine the contribution of noise for each train passby. Instrumentation consisted of Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter, which was calibrated in the field before and after use with a LDL Model CAL200 acoustical calibrator. Table 4 shows the results of the ambient noise level measurements, and measurements of train passbys.

Table 4
Ambient Noise Measurement Results

Site & Time		SR 99 Noise Measurement Results			Train Passby Noise Measurement Results		
		Leq	L50	Lmax	Leq	Lmax	SEL
A	12:30 p.m.	55.1	54.5	56.5	79.5	86.5	93.0
A	6:30 p.m.	54.6	54.7	62.0	78.8	87.3	93.5

Source: j.c. brennan & associates, Inc. - 2021

Existing Exterior Traffic Noise Levels

j.c. brennan & associates, Inc. employs the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA RD-77-108) for the prediction of traffic noise levels. The model is based upon the CALVENO noise emission factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. Direct inputs to the FHWA Model included traffic volumes provided by the traffic consultant.

Table 5 shows the predicted existing traffic noise levels. Appendix B provides the complete inputs and results of the FHWA traffic noise prediction model.

Table 5
Existing Traffic Noise Levels

Roadway	Average Daily Traffic	Distance	Traffic Noise Level (Ldn)	Distance to Contours (feet)	
				65 dB Ldn	70 dB Ldn
SR 99*					
Adjacent to the Project Site	86,417	570-feet	60 dB	275-feet	128-feet
B Street					
At Project Site	6,450	75-feet	60 dB	35-feet	16-feet
Project Site to Briarwood Dr	6,450	75-feet	60 dB	35-feet	16-feet
Briarwood Dr to Winton Pkwy	8,950	75-feet	62 dB	44-feet	20-feet
Project Site to Prusso St.	6,750	75-feet	60 dB	36-feet	17-feet
Prusso St to Main St	6,400	75-feet	60 dB	35-feet	16-feet
Winton Pkwy					
B Street to Joseph Gallo Ct	11,050	75-feet	62 dB	51-feet	23-feet
Joseph Gallo Ct to SR 99	16,700	75-feet	64 dB	67-feet	31-feet
Main St					
South of B St	6,100	75-feet	60 dB	34-feet	16-feet
North of B St	9,380	75-feet	62 dB	45-feet	21-feet

*SR 99 included a -6 dB correction due to the depressed freeway. A barrier calculation was conducted to determine the shielding effects of the embankment and depressed freeway.
All distances are from the roadway centerline.
Source: j.c. brennan & associates, Inc. - 2021

Railroad Noise Levels

The Union Pacific Railroad (UPRR) is located approximately 530-feet north of the project site. Noise measurements of train passbys indicated that the typical Sound Exposure Level (SEL) was 93 dB, and the maximum noise level was 87 dB. There are approximately 36 trains per day along the UPRR track. Using the following formula, the Ldn at the project site can be determined:

SEL + 10* (logarithm of the number of daily events) – 49.4: where

- SEL is the mean Sound Exposure Level;
- Daily events include 10 times the number of train operations during the nighttime period of 10 p.m to 7 a.m.;
- 49.4 is 10 times the logarithm of the number of seconds in a 24-hour period.

The calculated Ldn due to train operations is 65.5 dB .

Industrial Noise Levels

The nearest industrial facilities are located over 1,500-feet north of the project site. During the site visit, the industrial noise did not contribute to the overall measured noise levels.

4. IMPACT EVALUATION

Future Exterior Traffic Noise Levels

Future Increases in Traffic Noise Levels Due to the Project

Future traffic noise levels are based upon the traffic volumes provided by the project traffic analysis for the Existing + Project, Cumulative No Project (No Winton Extension), Cumulative Plus Project (No Winton Extension), Cumulative No Project (With Winton Extension), and Cumulative Plus Project (With Winton Extension) scenarios. Using the FHWA traffic noise prediction model, the traffic noise levels were determined, and are shown in Tables 6 and 7. Table 6 shows the predicted noise levels without the proposed Winton Parkway Extension. Table 7 shows the predicted noise levels with the proposed Winton Parkway Extension.

TABLE 6
FUTURE TRAFFIC NOISE LEVELS AND DISTANCES TO TRAFFIC NOISE CONTOURS

Roadway/ Segment	Existing + Project		Cumulative No Project No Winton Pkwy Extension		Cumulative + Project No Winton Pkwy Extension			
							Distance to Contours	
	ADT	Ldn	ADT	Ldn	ADT	Ldn	65 dBA	70 dBA
SR 99*								
Adjacent to the Project Site (570-ft)	86,417	60 dB	138,482	62 dB	138,482	62 dB	377-feet	175-feet
B Street								
At Project Site (75-feet)	6,670	60 dB	9,650	62 dB	9,820	62 dB	47-feet	22-feet
Project Site to Briarwood Dr (75-feet)	6,690	60 dB	9,650	62 dB	9,890	62 dB	47-feet	22-feet
Briarwood Dr to Winton Pkwy (75-feet)	9,190	62 dB	13,350	63 dB	13,590	63 dB	58-feet	27-feet
Project Site to Prusso St. (75-feet)	7,000	60 dB	9,950	62 dB	10,190	62 dB	48-feet	22-feet
Prusso St to Main St (75-feet)	6,620	60 dB	8,980	62 dB	9,200	62 dB	45-feet	21-feet
Winton Pkwy								
B Street to Joseph Gallo Ct (75-feet)	11,190	62 dB	14,180	64 dB	16,120	64 dB	65-feet	30-feet
Joseph Gallo Ct to SR 99 (75-feet)	16,800	64 dB	22,520	66 dB	22,620	66 dB	82-feet	38-feet
Main St								
South of B St (75-feet)	6,150	60 dB	8,560	61 dB	8,610	61 dB	43-feet	20-feet
North of B St (75-feet)	9,380	62 dB	10,710	62 dB	10,840	62 dB	50-feet	23-feet

*SR 99 included a -8 dB correction due to the depressed freeway. A barrier calculation was conducted to determine the shielding effects of the embankment and depressed freeway.
All distances are from the roadway centerline
Source: j.c. brennan & associates, Inc. - 2021

TABLE 7
FUTURE TRAFFIC NOISE LEVELS AND DISTANCES TO TRAFFIC NOISE CONTOURS

Roadway/ Location	Cumulative No Project With Winton Pkwy Extension		Cumulative + Project With Winton Pkwy Extension			
	ADT	Ldn	ADT	Ldn	Distance t-feet o Contours	
					65 dBA	70 dBA
SR 99*						
Adjacent to the Project Site (570-ft)	138,482	62 dB	138,482	62 dB	377-feet	175-feet
B Street						
At Project Site (75-feet)	7,610	61 dB	7,830	61 dB	39-feet	18-feet
Project Site to Briarwood Dr (75-feet)	7,610	61 dB	7,850	61 dB	39-feet	18-feet
Briarwood Dr to Winton Pkwy (75-feet)	7,500	61 dB	4,740	61 dB	39-feet	18-feet
Project Site to Prusso St. (75-feet)	7,940	61 dB	8,180	61 dB	41-feet	19-feet
Prusso St to Main St (75-feet)	7,490	61 dB	7,710	61 dB	39-feet	18-feet
Winton Pkwy						
B Street to Joseph Gallo Ct (75-feet)	15,980	64 dB	16,120	64 dB	65-feet	30-feet
Joseph Gallo Ct to SR 99 (75-feet)	22,520	66 dB	22,620	66 dB	81-feet	38-feet
Main St						
South of B St (75-feet)	7,050	60 dB	7,100	60 dB	37-feet	17-feet
North of B St (75-feet)	10,710	62 dB	10,850	62 dB	50-feet	23-feet
Winton Pkwy Extension	7,520	61 dB	7,520	61 dB	39-feet	18-feet

*SR 99 included a -8 dB correction due to the depressed freeway. A barrier calculation was conducted to determine the shielding effects of the embankment and depressed freeway.
All distances are from the roadway centerline
Source: j.c. brennan & associates, Inc. - 2021

Based upon comparing Tables 6 and 7, the project does not result in a significant increase in traffic noise levels under any of the scenarios. The analysis does indicate that traffic noise levels will decrease between 1 and 2 dB along portions of B Street and Main Street with the construction of the proposed Winton Parkway Extension.

Future Traffic Noise Levels at the Project Site

The primary traffic noise source at the project site is S.R. 99. The predicted traffic noise level under future conditions is 62 dB Ldn at the nearest building facades. This is a less than significant noise impact.

Future Railroad Noise Levels at the Project Site

It is assumed that future railroad noise levels will be consistent with the existing railroad operations noise levels and will be 65.5 dB Ldn. This is a potentially significant noise source. Based upon the project design, the Community Open Space, Patio Space and recreation areas are located within the interior of the project site, and will have a minimum of 8 to 10 dB reduction in noise due to shielding from the buildings. Therefore, the project will comply with the exterior noise level standard at the common outdoor areas. This is a less than significant noise impact.

Cumulative Future Traffic and Railroad Noise Levels at the Project Site

The cumulative traffic and railroad noise levels at the project site will be 67.2 dB Ldn. Based upon the project design, the Community Open Space, Patio Space and recreation areas are located within the interior of the project site, and will have a minimum of 8 to 10 dB reduction in noise due to shielding from the buildings. Therefore, the project will comply with the exterior noise level standard at the common outdoor areas. This is a less than significant noise impact.

Future Interior Traffic and Railroad Noise Levels

As a means of determining the ability of the project to achieve the interior noise level criterion of 45 dBA Ldn, the building construction is wood frame, with a minimum of R-19 insulation in the stud cavities and R-38 in the attic spaces. The siding is assumed to be stucco over foam board. The interior is assumed to be a 5/8" Type X gypsum board. Windows are assumed to be typical dual glazed windows which have a typical STC rating of approximately 26.

Typical construction will result in an exterior to interior noise level reduction of 25 dBA, provided that air conditioning is provided to allow residents to close windows and doors for the proper acoustical isolation. It is assumed that the first row of residences will experience traffic and railroad noise levels of no more than 70 dBA Ldn. Therefore, interior noise levels are expected to comply with the interior noise level standard of 45 dBA Ldn. This is a less than significant noise impact.

Future Construction Noise Levels

Construction of the Proposed Project would temporarily increase noise levels during construction. During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in construction would generate maximum noise levels, as indicated in Table 8, ranging from 76 to 88 dB at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

Table 8 Construction Equipment Noise						
Type of Equipment	Predicted Noise Levels, L_{max} dB				Distances to Noise Contours (feet)	
	Noise Level at 50’	Noise Level at 100’	Noise Level at 200’	Noise Level at 400’	70 dB L_{max} contour	65 dB L_{max} contour
Backhoe	78	72	66	60	126	223
Compactor	83	77	71	65	223	397
Compressor (air)	78	72	66	60	126	223
Dozer	82	76	70	64	199	354
Dump Truck	76	70	64	58	100	177
Excavator	81	75	69	63	177	315
Generator	81	75	69	63	177	315
Pneumatic Tools	85	79	73	67	281	500

Source: *Roadway Construction Noise Model User’s Guide*. Federal Highway Administration. FHWA-HEP-05-054. January 2006.

The General Plan has anticipated construction activities to implement the changes and increases in land use. It is expected that construction activities would follow the guidelines contained in the Municipal Code Sections as follows:

Section 4-6-27 – Grading Hours of Operation
Section 4-6-28 – Grading Dust and Noise Control
Section 10-7-2 – Noise Restrictions General

This is a less than significant impact.

<u>Future Construction Vibration Levels</u>

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 9, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second. Table 9 indicates that the threshold for architectural damage to structures is 0.20 in/sec p.p.v.

The primary vibration-generating activities associated with the project would occur when the infrastructure such as grading, utilities, and parking lots are constructed. Sensitive receptors are generally a minimum of 50-feet from the construction site. Based upon Table 10, construction activities would produce peak particle velocities of less than 0.09 inches/second and 87 VdB at a distance of 25 feet. Therefore, the construction vibration levels are not expected to result in any damage to structures. This is a less than significant impact.

TABLE 9
EFFECTS OF VARIOUS VIBRATION LEVELS ON PEOPLE AND BUILDINGS

Vibration Level (Peak Particle Velocity)*			
mm/s	*in/sec*	*Human Reaction*	*Effect on Buildings*
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of “architectural” damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of “architectural” damage to normal dwelling - houses with plastered walls and ceilings Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize “architectural” damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause “architectural” damage and possibly minor structural damage.

Source: *Transportation Related Earthborne Vibrations, Caltrans Experiences.* Technical Advisory: TAV-02-01-R9601. February 20, 2002.

TABLE 10 VIBRATION LEVELS FOR VARYING CONSTRUCTION EQUIPMENT		
Type of Equipment	*Peak Particle Velocity @ 25 feet (inches/second)*	*Approximate Velocity Level @ 25 feet (VdB)*
Large Bulldozer	0.089	87
Loaded Trucks	0.076	86
Small Bulldozer	0.003	58
Auger/drill Rigs	0.089	87
Jackhammer	0.035	79
Vibratory Hammer	0.070	85

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006

Appendix A
Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
$L_{(n)}$	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50% of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the AMaximum@ level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is s rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2021-108 Terrasanta Villas Apts
Description: Existing
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	SR 99	At Project Site	86,417	80		20	4.2	12.1	65	570	-8
2	B Street	At Project Site	6,450	85		15	2	1	35	75	
3	B Street	Project Site to Briarwood Dr	6,450	85		15	2	1	35	75	
4	B Street	Briarwood Dr to Winton Pkwy	8,950	85		15	2	1	35	75	
5	B Street	Project Site to Prusso St	6,760	85		15	2	1	35	75	
6	B Street	Prusso St to Main St	6,400	85		15	2	1	35	75	
7	Winton Pkwy	B Street to Joseph Gallo Ct	11,050	85		15	2	1	35	75	
8	Winton Pkwy	Joseph Gallo Ct to SR 99	16,700	85		15	2	1	35	75	
9	Main Street	South of B St	6,100	85		15	2	1	35	75	
10	Main Street	North of B St	9,250	85		15	2	1	35	75	
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FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2021-108 Terrasanta Villas Apts
Description: Existing
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	SR 99	At Project Site	56.2	49.4	57.4	60
2	B Street	At Project Site	58.3	51.1	53.3	60
3	B Street	Project Site to Briarwood Dr	58.3	51.1	53.3	60
4	B Street	Briarwood Dr to Winton Pkwy	59.7	52.6	54.7	62
5	B Street	Project Site to Prusso St	58.5	51.3	53.5	60
6	B Street	Prusso St to Main St	58.3	51.1	53.3	60
7	Winton Pkwy	B Street to Joseph Gallo Ct	60.6	53.5	55.7	62
8	Winton Pkwy	Joseph Gallo Ct to SR 99	62.4	55.3	57.5	64
9	Main Street	South of B St	58.1	50.9	53.1	60
10	Main Street	North of B St	59.9	52.7	54.9	62

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2021-108 Terrasanta Villas Apts
Description: Existing
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	-------- Distances to Traffic Noise Contours --------				
			75	70	65	60	55
1	SR 99	At Project Site	59	128	275	593	1278
2	B Street	At Project Site	8	16	35	76	164
3	B Street	Project Site to Briarwood Dr	8	16	35	76	164
4	B Street	Briarwood Dr to Winton Pkwy	9	20	44	95	204
5	B Street	Project Site to Prusso St	8	17	36	79	169
6	B Street	Prusso St to Main St	8	16	35	76	163
7	Winton Pkwy	B Street to Joseph Gallo Ct	11	23	51	109	235
8	Winton Pkwy	Joseph Gallo Ct to SR 99	14	31	67	143	309
9	Main Street	South of B St	7	16	34	73	158
10	Main Street	North of B St	10	21	45	97	209

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2021-108 Terrasanta Villas Apts
Description: Existing + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	SR 99	At Project Site	86,417	80		20	4.2	12.1	65	570	-8
2	B Street	At Project Site	6,670	85		15	2	1	35	75	
3	B Street	Project Site to Briarwood Dr	6,690	85		15	2	1	35	75	
4	B Street	Briarwood Dr to Winton Pkwy	9,190	85		15	2	1	35	75	
5	B Street	Project Site to Prusso St	7,000	85		15	2	1	35	75	
6	B Street	Prusso St to Main St	6,620	85		15	2	1	35	75	
7	Winton Pkwy	B Street to Joseph Gallo Ct	11,190	85		15	2	1	35	75	
8	Winton Pkwy	Joseph Gallo Ct to SR 99	16,800	85		15	2	1	35	75	
9	Main Street	South of B St	6,150	85		15	2	1	35	75	
10	Main Street	North of B St	9,380	85		15	2	1	35	75	
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FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2021-108 Terrasanta Villas Apts
Description: Existing + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	SR 99	At Project Site	56.2	49.4	57.4	60
2	B Street	At Project Site	58.5	51.3	53.5	60
3	B Street	Project Site to Briarwood Dr	58.5	51.3	53.5	60
4	B Street	Briarwood Dr to Winton Pkwy	59.8	52.7	54.9	62
5	B Street	Project Site to Prusso St	58.7	51.5	53.7	60
6	B Street	Prusso St to Main St	58.4	51.3	53.4	60
7	Winton Pkwy	B Street to Joseph Gallo Ct	60.7	53.5	55.7	62
8	Winton Pkwy	Joseph Gallo Ct to SR 99	62.5	55.3	57.5	64
9	Main Street	South of B St	58.1	50.9	53.1	60
10	Main Street	North of B St	59.9	52.8	55.0	62

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2021-108 Terrasanta Villas Apts
Description: Existing + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	SR 99	At Project Site	59	128	275	593	1278
2	B Street	At Project Site	8	17	36	78	168
3	B Street	Project Site to Briarwood Dr	8	17	36	78	168
4	B Street	Briarwood Dr to Winton Pkwy	10	21	45	96	208
5	B Street	Project Site to Prusso St	8	17	37	80	173
6	B Street	Prusso St to Main St	8	17	36	77	167
7	Winton Pkwy	B Street to Joseph Gallo Ct	11	24	51	110	237
8	Winton Pkwy	Joseph Gallo Ct to SR 99	14	31	67	144	310
9	Main Street	South of B St	7	16	34	74	159
10	Main Street	North of B St	10	21	45	98	210

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	SR 99	At Project Site	138,482	80		20	4.2	12.1	65	570	-8
2	B Street	At Project Site	9,650	85		15	2	1	35	75	
3	B Street	Project Site to Briarwood Dr	9,650	85		15	2	1	35	75	
4	B Street	Briarwood Dr to Winton Pkwy	13,350	85		15	2	1	35	75	
5	B Street	Project Site to Prusso St	9,950	85		15	2	1	35	75	
6	B Street	Prusso St to Main St	8,980	85		15	2	1	35	75	
7	Winton Pkwy	B Street to Joseph Gallo Ct	14,180	85		15	2	1	35	75	
8	Winton Pkwy	Joseph Gallo Ct to SR 99	22,520	85		15	2	1	35	75	
9	Main Street	South of B St	8,560	85		15	2	1	35	75	
10	Main Street	North of B St	10,710	85		15	2	1	35	75	
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FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	SR 99	At Project Site	58.3	51.4	59.5	62
2	B Street	At Project Site	60.1	52.9	55.1	62
3	B Street	Project Site to Briarwood Dr	60.1	52.9	55.1	62
4	B Street	Briarwood Dr to Winton Pkwy	61.5	54.3	56.5	63
5	B Street	Project Site to Prusso St	60.2	53.0	55.2	62
6	B Street	Prusso St to Main St	59.7	52.6	54.8	62
7	Winton Pkwy	B Street to Joseph Gallo Ct	61.7	54.6	56.7	64
8	Winton Pkwy	Joseph Gallo Ct to SR 99	63.7	56.6	58.8	66
9	Main Street	South of B St	59.5	52.4	54.6	61
10	Main Street	North of B St	60.5	53.3	55.5	62

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	-------- Distances to Traffic Noise Contours -------- 75	70	65	60	55
1	SR 99	At Project Site	81	175	377	812	1750
2	B Street	At Project Site	10	21	46	100	214
3	B Street	Project Site to Briarwood Dr	10	21	46	100	214
4	B Street	Briarwood Dr to Winton Pkwy	12	27	57	124	266
5	B Street	Project Site to Prusso St	10	22	47	102	219
6	B Street	Prusso St to Main St	9	20	44	95	204
7	Winton Pkwy	B Street to Joseph Gallo Ct	13	28	60	129	277
8	Winton Pkwy	Joseph Gallo Ct to SR 99	18	38	81	175	377
9	Main Street	South of B St	9	20	43	92	198
10	Main Street	North of B St	11	23	50	107	230

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	SR 99	At Project Site	138,482	80		20	4.2	12.1	65	570	-8
2	B Street	At Project Site	9,820	85		15	2	1	35	75	
3	B Street	Project Site to Briarwood Dr	9,890	85		15	2	1	35	75	
4	B Street	Briarwood Dr to Winton Pkwy	13,590	85		15	2	1	35	75	
5	B Street	Project Site to Prusso St	10,190	85		15	2	1	35	75	
6	B Street	Prusso St to Main St	9,200	85		15	2	1	35	75	
7	Winton Pkwy	B Street to Joseph Gallo Ct	16,120	85		15	2	1	35	75	
8	Winton Pkwy	Joseph Gallo Ct to SR 99	22,620	85		15	2	1	35	75	
9	Main Street	South of B St	8,610	85		15	2	1	35	75	
10	Main Street	North of B St	10,840	85		15	2	1	35	75	
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FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	SR 99	At Project Site	58.3	51.4	59.5	62
2	B Street	At Project Site	60.1	53.0	55.2	62
3	B Street	Project Site to Briarwood Dr	60.2	53.0	55.2	62
4	B Street	Briarwood Dr to Winton Pkwy	61.5	54.4	56.6	63
5	B Street	Project Site to Prusso St	60.3	53.1	55.3	62
6	B Street	Prusso St to Main St	59.8	52.7	54.9	62
7	Winton Pkwy	B Street to Joseph Gallo Ct	62.3	55.1	57.3	64
8	Winton Pkwy	Joseph Gallo Ct to SR 99	63.8	56.6	58.8	66
9	Main Street	South of B St	59.6	52.4	54.6	61
10	Main Street	North of B St	60.6	53.4	55.6	62

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	SR 99	At Project Site	81	175	377	812	1750
2	B Street	At Project Site	10	22	47	101	217
3	B Street	Project Site to Briarwood Dr	10	22	47	101	218
4	B Street	Briarwood Dr to Winton Pkwy	13	27	58	125	269
5	B Street	Project Site to Prusso St	10	22	48	103	222
6	B Street	Prusso St to Main St	10	21	45	96	208
7	Winton Pkwy	B Street to Joseph Gallo Ct	14	30	65	140	302
8	Winton Pkwy	Joseph Gallo Ct to SR 99	18	38	82	176	378
9	Main Street	South of B St	9	20	43	92	199
10	Main Street	North of B St	11	23	50	108	232

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FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative No Project With Winton Extension
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	SR 99	At Project Site	138,482	80		20	4.2	12.1	65	570	-8
2	B Street	At Project Site	7,610	85		15	2	1	35	75	
3	B Street	Project Site to Briarwood Dr	7,610	85		15	2	1	35	75	
4	B Street	Briarwood Dr to Winton Pkwy	7,500	85		15	2	1	35	75	
5	B Street	Project Site to Prusso St	7,940	85		15	2	1	35	75	
6	B Street	Prusso St to Main St	7,490	85		15	2	1	35	75	
7	Winton Pkwy	B Street to Joseph Gallo Ct	15,980	85		15	2	1	35	75	
8	Winton Pkwy	Joseph Gallo Ct to SR 99	22,520	85		15	2	1	35	75	
9	Main Street	South of B St	7,050	85		15	2	1	35	75	
10	Main Street	North of B St	10,710	85		15	2	1	35	75	
11	Winton Extension	Entire Segment	7,520	85		15	2	1	35	75	
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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative No Project With Winton Extension
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	SR 99	At Project Site	58.3	51.4	59.5	62
2	B Street	At Project Site	59.0	51.9	54.0	61
3	B Street	Project Site to Briarwood Dr	59.0	51.9	54.0	61
4	B Street	Briarwood Dr to Winton Pkwy	59.0	51.8	54.0	61
5	B Street	Project Site to Prusso St	59.2	52.0	54.2	61
6	B Street	Prusso St to Main St	59.0	51.8	54.0	61
7	Winton Pkwy	B Street to Joseph Gallo Ct	62.2	55.1	57.3	64
8	Winton Pkwy	Joseph Gallo Ct to SR 99	63.7	56.6	58.8	66
9	Main Street	South of B St	58.7	51.5	53.7	60
10	Main Street	North of B St	60.5	53.3	55.5	62
11	Winton Extension	Entire Segment	59.0	51.8	54.0	61

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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative No Project With Winton Extension
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	SR 99	At Project Site	81	175	377	812	1750
2	B Street	At Project Site	8	18	39	85	183
3	B Street	Project Site to Briarwood Dr	8	18	39	85	183
4	B Street	Briarwood Dr to Winton Pkwy	8	18	39	84	181
5	B Street	Project Site to Prusso St	9	19	41	87	188
6	B Street	Prusso St to Main St	8	18	39	84	181
7	Winton Pkwy	B Street to Joseph Gallo Ct	14	30	65	139	300
8	Winton Pkwy	Joseph Gallo Ct to SR 99	18	38	81	175	377
9	Main Street	South of B St	8	17	37	81	174
10	Main Street	North of B St	11	23	50	107	230
11	Winton Extension	Entire Segment	8	18	39	84	182

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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative Plus Project With Winton Extension
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	SR 99	At Project Site	138,482	80		20	4.2	12.1	65	570	-8
2	B Street	At Project Site	7,610	85		15	2	1	35	75	
3	B Street	Project Site to Briarwood Dr	7,610	85		15	2	1	35	75	
4	B Street	Briarwood Dr to Winton Pkwy	7,500	85		15	2	1	35	75	
5	B Street	Project Site to Prusso St	7,940	85		15	2	1	35	75	
6	B Street	Prusso St to Main St	7,490	85		15	2	1	35	75	
7	Winton Pkwy	B Street to Joseph Gallo Ct	15,980	85		15	2	1	35	75	
8	Winton Pkwy	Joseph Gallo Ct to SR 99	22,520	85		15	2	1	35	75	
9	Main Street	South of B St	7,050	85		15	2	1	35	75	
10	Main Street	North of B St	10,710	85		15	2	1	35	75	
11	Winton Extension	Entire Segment	7,520	85		15	2	1	35	75	
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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels

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Appendix B

FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output

Project #: 2021-108 Terrasanta Villas Apts
Description: Cumulative Plus Project With Winton Extension
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11	Winton Extension	Entire Segment	8	18	39	84	182

APPENDIX F
TRAFFIC STUDY

TRANSPORTATION IMPACT ANALYSIS

FOR

TIERRASANTA VILLAGE APARTMENTS

Livingston, CA

Prepared For:

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Prepared By:

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(916) 660-1555

April 16, 2021

0780-19

Tierrasanta Village Apartments.rpt

TRANSPORTATION IMPACT ANALYSIS FOR
TIERRASANTA VILLAGE APARTMENTS
Livingston, CA

TABLE OF CONTENTS

KDA

TRANSPORTATION IMPACT ANALYSIS FOR
TIERRASANTA VILLAGE APARTMENTS
Livingston, CA

INTRODUCTION

This report summarizes KD Anderson & Associates analysis of the potential Transportation impacts associated with development of the Tierrasanta Village Apartments Project in Livingston, CA. The project site is located in the area north of B Street between Briarwood Drive and Prusso Street opposite the Livingston Unified School District's (LUSD) Office and Prusso / Walnut Child Development Centers, as noted in Figure 1. The project proposes 80 affordable dwelling units, and access is proposed via two full access driveways on B Street, as shown in Figure 2.

The purpose of this analysis is to identify the potential transportation-related impacts / effects of the project within the context of current and future conditions in Livingston. Under CEQA guidelines the analysis addresses the project's effects on regional Vehicle Miles Traveled (VMT), alternative transportation modes and safety on state facilities. While Level of Service (LOS) analysis is no longer a CEQA consideration, a local traffic operational analysis was performed to determine consistency with City of Livingston General Plan polices and to provide supporting information for CEQA topics of safety and impacts to California Department of Transportation (Caltrans) facilities.

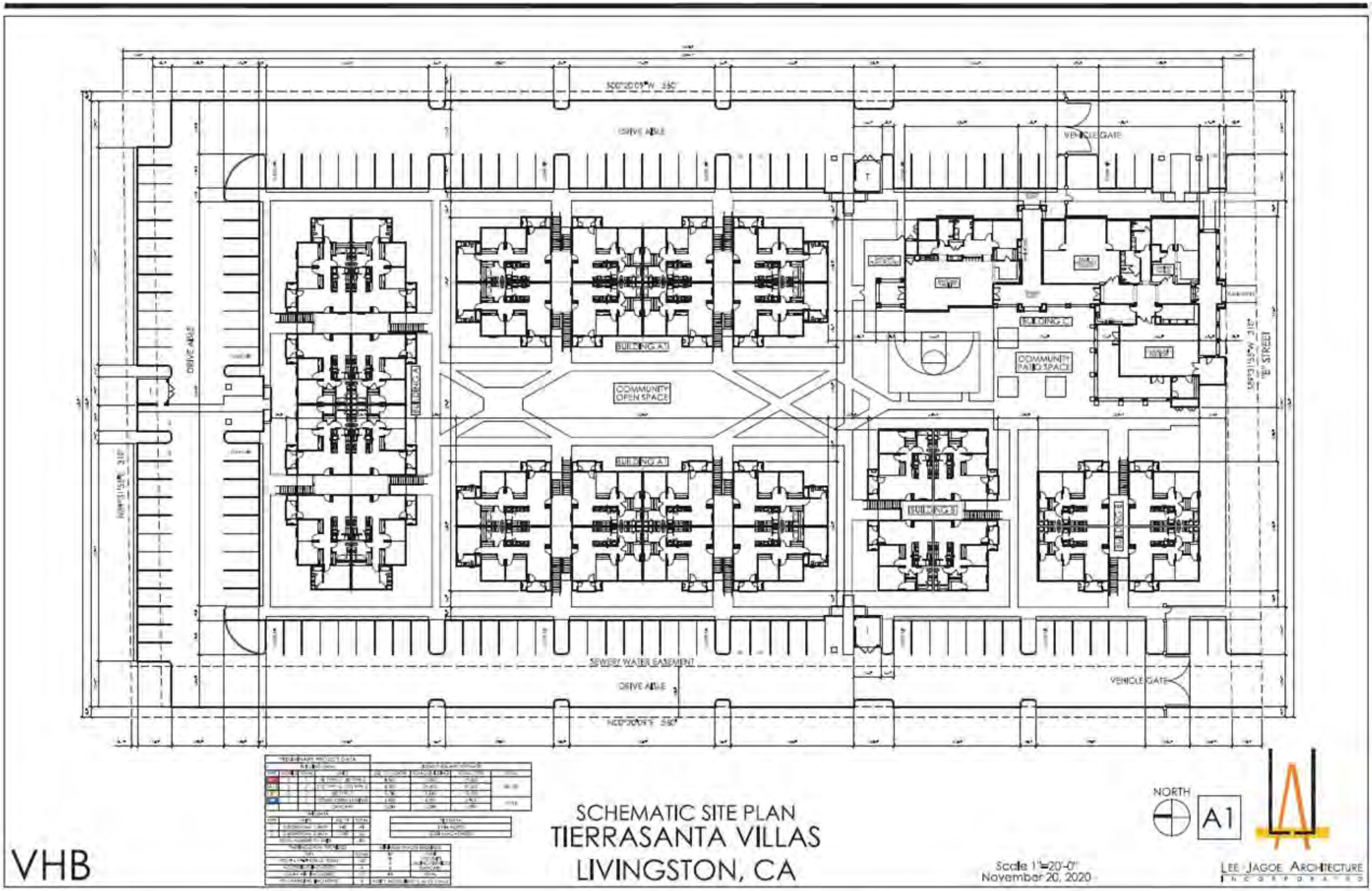
The traffic operational includes evaluation of existing traffic operating conditions in the area based upon current weekday a.m. and p.m. peak hour traffic volumes. The extent to which improvements may already be needed to meet minimum standards has been determined. The characteristics of the proposed project have been determined based on probable peak hour and daily trip generation, regional trip distribution and local trip assignment. Forecasts for future year traffic conditions, based on occupancy of other already approved development identified by the City of Livingston have been analyzed with and without the proposed project. The project's impact to alternative transportation modes has also been considered per CEQA requirements. Improvements or mitigation measures needed to ensure satisfactory and safe operation of study area intersections under each development scenario are recommended.

VICINITY MAP

KD Anderson & Associates, Inc.
Transportation Engineers

0780-19 RA 4/15/2021

figure 1



SITE PLAN

KD Anderson & Associates, Inc.
Transportation Engineers

0780-19 RA 4/15/2021

figure 2

EXISTING SETTING

Existing Street and Highway System

Streets and Highways. Regionally, the Tierrasanta Village Apartments will be served by a state highway and several major Livingston roadways. Primary regional access is provided by State Route 99. Other access is available via Winton Parkway, B Street and Main Street, as well as other local city streets.

State Route 99 (SR 99) is the primary north-south transportation corridor California, although through Merced County and in the vicinity of the project site, the highway has a northwest-to-southeast alignment. SR 99 is a controlled access freeway with a six-lane width southeast of Hammatt Avenue and a four-lane width northwest of Hammatt Avenue to the Stanislas County line. Project access to SR 99 is provided via the Winton Parkway interchange, although access to the Hammatt Avenue interchange via Main Street and Campbell Blvd in the shortest route to SR 99 south of Livingston. The most recent traffic count data available from Caltrans (2019) indicate that SR 99 carries an average annual daily traffic (AADT) volume of 60,000 to 62,000 vehicles per day and peak hour volume of 5,500 to 5,800 in the vicinity of the project (California Department of Transportation 2021)[1]. Trucks comprise 24% of the daily traffic volume on SR 99 in this area[2].

Winton Parkway is designated an arterial street in the *Circulation Element* of the *General Plan – Livingston, California* (Livingston 1999)[3]. The Winton Parkway interchange is one of two interchanges providing the Livingston area with access to SR 99. Within the study area, Winton Parkway is a north-south roadway the two to six through travel lanes. Winton Parkway begins north of SR 99 at an intersection on Campbell Avenue and continues south across SR 99 to B Street. The Circulation Element notes that a Winton Parkway is planned to continue as a four-lane roadway south from the current B Street terminus to Peach Avenue. The posted speed limit is 40 mph in the area of the project.

B Street is also designated an arterial street in the Circulation Element. B Street enters the Livingston City limits on the west as Vinewood Avenue and continues easterly across Winton parkway to Main Street. Within the study area, B Street varies from a two-lane street to a four-lane facility, and improvements have generally been made where development has occurred. The posted speed limit is 35 mph, and a 25 mph school zone is marked east of Briarwood Drive.

Main Street in combination with Livingston-Cressey Road is the primary north-south route through central Livingston and is designed an arterial in the Circulation Element. Livingston-Cressey Road enters the community from the north and crosses SR 99 to become Main Street. Main Street continues southerly and becomes Lincoln Blvd in rural Merced County. Main Street is a two-lane roadway with on-street parking in the downtown area near the proposed project, and the posted speed limit is 25 mph.

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1 https://dot.ca.gov/programs/traffic-operations/census
2 Ibid
3 https://www.cityoflivingston.org/commdev/page/1999-general-plan-environmental-impact-report

Prusso Street is a north-south street that extends south from B Street to Peach Avenue. Prusso Street is designated a collector in the Circulation Element. On-street parking is permitted on this two-lane street and a 25 mph prima facie residential speed limit applies, but the area south of B Street is also marked as a 25 mph school zone.

Briarwood Drive is a two-lane local street that extends south from B Street in the area between Winton Parkway and Prusso Street. South of Montcliff Way the route is named Emerald Drive and continues to Peach Avenue. The posted speed limit is 25 mph. Because Winton Parkway does not yet extend south beyond B Street, Briarwood Drive has become the primary connection between Winton Parkway and the southern Livingston area.

F Street is an east-west street that traverses Livingston in the area ¼ mile south of B Street. F Street originates at the Flint Avenue / Robin Avenue intersection west of Livingston and continues easterly across Main Street to Hammatt Avenue. This two-lane roadway is designated a collector in the Circulation Element. The posted speed limit is 25 mph west of Hammatt Avenue. The land uses along F Street west of Hammatt Avenue are primarily residential, while agricultural and commercial uses exist in the east. Based on the peak hour volume collected for the study the daily traffic volume west of Hammatt Avenue is estimated to be 3,850 ADT.

Connection to SR 99. The ***SR 99 / Winton Parkway interchange*** is a diamond configuration with roughly 670 feet between ramp intersections (i.e., centerline to centerline, or c-t-c). Under Caltrans naming convention SR 99 is a north-south freeway, and the ramps are thus designated "northbound" and "southbound" even though the alignment of the freeway through Livingston is generally east to west. Campbell Blvd intersects Winton Parkway about 500 feet from the SR 99 NB ramps intersection (c-t-c), and the Joseph Gallo Court intersection is about 480 feet (c-t-c) from the SR 99 SB ramps. The SR 99 off-ramps terminate at all-way stop controlled intersections. The SB off-ramp is 1,450 feet long (gore to limit line), and the NB off-ramp is 1,240 feet long. The NB on-ramp and SB on-ramp are about 1,275 and 1,175 feet long, respectively and are followed by a 275-foot long auxiliary lanes. A sidewalk is provided on the east side of the overcrossing.

Caltrans publishes daily traffic volume information for freeway ramps, and the most recent data is summarized in Table 1.

TABLE 1 STATE ROUTE 99 RAMPS DAILY VOLUMES			
Direction on SR 99	**Location**	**Year**	**Daily Volume**
Southbound	Off-ramp to Winton Parkway	2016	8,338
	On-ramp from Winton Parkway	2016	1,291
	Off-ramp to Hammatt Avenue	2012	2,540
	On-ramp from Hammatt Avenue	2012	2,850
Northbound	Off-ramp to Hammatt Avenue	2016	2,829
	On-ramp from Hammatt Avenue	2016	1,057
	Off-ramp to Winton Parkway	2016	2,991
	On-ramp from Winton Parkway	2012	6,100
Source: https://dot.ca.gov/programs/traffic-operations/census			

Study Intersections

Study Locations. In urban areas the quality of flow of traffic is often governed by the operation of intersections, and as directed by the City of Livingston the operation of the following seven existing intersections was analyzed for this study:

1. Winton Parkway & SR 99 Northbound Ramps
2. Winton Parkway & SR 99 Southbound Ramps
3. Winton Parkway & Joseph Gallo Drive
4. Winton Parkway / B Street
5. B Street /Briarwood Drive
6. B Street / Prusso Street
7. B Street / Main Street

The **Winton Parkway Avenue / SR 99 NB ramps intersection** is controlled by all-way stop signs. Each approach has a single through travel lane with a separate left turn lane (175 feet long) on the northbound Winton Parkway approach. The intersection limit lines have been pulled back to accommodate the turning requirements of large trucks.

The **Winton Parkway / SR 99 SB ramps intersection** is also controlled by all-way stop signs, and the intersection layout is somewhat different from the NB Ramp intersection. The Winton Parkway approaches have two lanes, with a separate left turn lane (210 feet long) on the southbound approach and a separate right turn lane on northbound Winton Parkway approach. While the off-ramp is a single lane, motorists have been observed using the off-ramp shoulder as a defacto right turn lane. The intersection limit lines have been pulled back to accommodate the turning requirements of trucks.

The **Winton Parkway / Joseph Gallo Drive intersection** is controlled by a traffic signal. The Winton Parkway approaches have separate left turn lanes and two through travel lanes. The three-lane eastbound Joseph Gallo Drive approach has separate left turn, through and right turn lanes. The two-lane westbound Joseph Gallo Court approach has a separate left turn lane and combined thru+right turn lane. Crosswalks are striped across each leg of the intersection.

The **Winton Parkway / B Street intersection** is controlled by a traffic signal. The north half of the intersection has been constructed to its ultimate limits, but the south side is in an "interim" condition pending the extension of Winton Parkway. The interim configuration provides separate left turn and right turn lanes on the southbound Winton Parkway approach. The eastbound B Street approach has a separate left turn lane and a through travel lane. The westbound approach has two through lanes and separate right turn lane. Crosswalks are striped at the intersection.

The **B Street / Briarwood Drive intersection** is a "tee" controlled by an all-way stop. The eastbound B Street approach has a through lane and a right turn lane. The westbound B Street approach is a single lane that allows left turns and through traffic. The northbound Briarwood approach is striped as a single lane, but the approach is wide enough to accommodate separate left and right turns. There are no marked crosswalks at this intersection.

The **B Street / Prusso Street intersection** is controlled by an all-way stop. The southbound approach is the access to the Casitas Del Sol community. All legs of the intersection have a single approach lane. School zone crosswalks are marked on the south and east legs of the intersection.

The **B Street / Main Street intersection** is controlled by in "interim" roundabout that was created by restriping an all-way stop intersection. Each approach has single travel lane. Crosswalks are striped across B Street in the area beyond the splitter islands.

<u>Alternative Transportation Modes</u>

Sidewalks. Concrete sidewalks exist at various locations along most City of Livingston streets but become less prevalent in outlying areas of the community or where development has not yet occurred. As noted in Table 2, there are sidewalks on the south side of B Street through the study area, but sidewalks are incomplete on the north side of B Street between the project site and Winton Parkway.

TABLE 2 SIDEWALK INVENTORY				
Street	**From**	**To**	**Side**	**Sidewalk**
B Street	Winton Parkway	Briarwood	North	Partial
			South	Yes
	Briarwood Drive	Prusso Street	North	Partial
			South	Yes
	Prusso Street	Main Street	North	Yes
			South	Yes
Briarwood Drive	B Street	F Street	West	Yes
			East	Yes
Prusso Street	B Street	F Street	East	Yes
			West	Yes

Bicycle Facilities. According to Caltrans guidelines, bicycle facilities are generally divided into four categories:

- Class I Bikeway (Bike Path). A completely separate facility designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized.
- Class II Bikeway (Bike Lane). A striped lane designated for the use of bicycles on a street or highway. Vehicle parking and vehicle/pedestrian cross-flow are permitted at designated locations.
- Class III Bikeway (Bike Route). A route designated by signs or pavement markings for bicyclists within the vehicular travel lane (i.e., shared use) of a roadway.
- Class IV Bikeway (Separated Bikeway). A bikeway for the exclusive use of bicycles and includes a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible posts, inflexible barriers, or on-street parking.

The City of Livingston has not adopted a formal bicycle master plan, and the General Plan does not identify future bicycle facilities. The *MCAG Merced County Regional Bicycle Transportation Plan (2008)*[4] suggests that bike lanes could be developed on:

- Winton Parkway north of B Street to Campbell Blvd
- Vinewood Ave – B Street from Robin Avenue to Main Street

[4] https://www.ca-ilg.org/sites/main/files/file-attachments/finalregbp.pdf

- Briarwood Drive from B Street to F Street
- Main Street from Livingston Cressey Road to Peach Avenue

A Class II Bike lane is striped on the south side of B Street between Winton Parkway and Briarwood Drive and on the north side of B Street along the limits of the Livingston Commons Shopping Center.

Public Transit. There are a variety of transit options available in Merced County. The level of transit service available to Merced County residents has increased since transit was introduced to the area in 1974. Historically, public transit has developed in response to the basic transportation needs of Merced's transit-dependent population and has maintained that standard of service.

Bus Service. *The Bus*, Merced's Regional Transit System, was formed from the consolidation of four former local public transit service providers in July 1996. Today "The Bus" is the single public transportation service provider for all of Merced County.

The Bus is administered and governed by the Transit Joint Powers Authority for Merced County. The authority is made up of an 11-member board of elected officials: one each from the cities of Atwater, Dos Palos, Gustine, Livingston, Los Banos, and Merced, along with five members of the Board of Supervisors of the County of Merced, California.

Currently, buses are operating on 16 fixed routes with another set of buses providing Paratransit service[5]. The Bus carries approximately 1,000,000 passengers per year.

The Bus provides two routes in the Livingston area:

- *Route L, the Livingston Commuter*, operates between Livingston and the City of Merced. In the vicinity of the project site, this route provides service along B Street from Winton Parkway to Main Street with a stop at the Rancho San Miguel Market (i.e., Livingston Commons SC) approximately 2,000 feet west of the project site. This route runs on one-hour headways from approximately 7:00 a.m. to 7:00 p.m.

- *Route T, the Turlock Commuter,* operates between Turlock and the City of Merced. This route provides service along B Street to the Walnut Avenue / Francis Street stop. This route runs on one-hour headways from approximately 6:00 a.m. to 8:00 p.m.

The Merced County 2017-18 to 2021-22 shortrange Transit Plan[6] identifies ridership on The Bus routes for the years 2015-2016. The Livingston Commuter (Route L) carried 56,271 passengers annually, and that demand was divided daily between average weekdays (145) and weekends (45). Because the route stops at various locations between Livingston and Merced, not all

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[5] https://www.mercedthebus.com/

[6] http://www.mcagov.org/DocumentCenter/View/1348/Merced-SRTP-FINAL-Report-with-Appendices?bidId=

passengers would be Livingston residents. The report's list of "Busiest Stops" indicated that Route L's Walnut Avenue / Francis Street stop averaged 2.1 "boardings or alightings" per route run.

Dial-A-Ride. Dial-A-Ride service is primarily for use by senior citizens, the handicapped, or those without a regularly scheduled fixed route bus operating within one mile of their residence. Dial-A-Ride is available to the general public except in the cities of Merced and Los Banos.

In the cities of Merced and Los Banos, Dial-A-Ride service is reserved for the exclusive use by the elderly (age 60 and older) and the handicapped. All Dial-A-Ride users in these two cities must register for Dial-A-Ride service.

Dial-A-Ride is generally open for service from 7:00 a.m. to 6:00 p.m. Monday through Friday and 9:00 a.m. to 5:00 p.m. on Saturday. However, service hours may vary from community to community depending on ridership demand.

Methods of Traffic Operational Analysis

With the implementation of SB 743 the evaluation of transportation impacts under the California Environmental Quality Act (CEQA) has moved from consideration of traffic flow and operation metrics based on vehicle delay (i.e., Level of Service) to evaluation of a project's effect on regional Vehicle Miles Traveled (VMT). However, local traffic operations may still be evaluated to consider a project's consistency with General Plan policies and to evaluate CEQA mandated analysis of impacts to Caltrans facilities based on safety.

Analysis Methods. To quantitatively evaluate traffic conditions and to provide a basis for comparison of operating conditions with and without project-generated traffic, Level of Service (LOS) was determined at study intersections, and 95th percentile queue lengths were identified at key locations.

Level of Service (LOS) is a quantitative measure of traffic operating conditions using a letter grade A through F. LOS A through F represents progressively worsening traffic conditions. The characteristics associated with the various LOS for intersections are presented in **Table 3**. The City of Livingston designates LOS C as their minimum standard.

TABLE 3 LEVEL OF SERVICE DEFINITIONS			
Level of Service	**Signalized Intersection**	**Unsignalized Intersection**	**Roadway (Daily)**
"A"	Uncongested operations, all queues clear in a single-signal cycle. Delay ≤ 10.0 sec	Little or no delay. Delay ≤ 10 sec/veh	Completely free flow.
"B"	Uncongested operations, all queues clear in a single cycle. Delay > 10.0 sec and ≤ 20.0 sec	Short traffic delays. Delay > 10 sec/veh and ≤ 15 sec/veh	Free flow, presence of other vehicles noticeable.
"C"	Light congestion, occasional backups on critical approaches. Delay > 20.0 sec and ≤ 35.0 sec	Average traffic delays. Delay > 15 sec/veh and ≤ 25 sec/veh	Ability to maneuver and select operating speed affected.
"D"	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. Delay > 35.0 sec and ≤ 55.0 sec	Long traffic delays. Delay > 25 sec/veh and ≤ 35 sec/veh	Unstable flow, speeds and ability to maneuver restricted.
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). Delay > 55.0 sec and ≤ 80.0 sec	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/veh and ≤ 50 sec/veh	At or near capacity, flow quite unstable.
"F"	Total breakdown, stop-and-go operation. Delay > 80.0 sec	Intersection blocked by external causes. Delay > 50 sec/veh	Forced flow, breakdown.
Sources: Highway Capacity Manual, 6th Edition.			

LOS was calculated for study intersections using the applicable methodology contained in the *Highway Capacity Manual 6th Edition* (Transportation Research Board 2016). The text that follows summarizes this methodology.

Signalized Intersections. The methodology employed for determining LOS at signalized intersections makes use of data describing traffic volume, intersection geometry and traffic signal timing to calculate the overall average delay per vehicle passing through the intersection. This average delay is compared to the prescribed thresholds to identify the applicable LOS.

Various software programs exist to evaluate traffic flows and suggest intersection delays and determine LOS. The City of Livingston has typically required intersection analysis based on HCM techniques using SYNCHRO software (Trafficware 2020). However, Caltrans District 10 has in the past required more complicated and data intensive analysis involving micro-simulation of intersection operations using SimTraffic simulation for closely spaced intersections. These two methods can yield appreciably different results. For this analysis the results from both methods have initially been calculated for intersections on Winton Parkway, before selecting a method for evaluating subsequent scenarios.

Unsignalized Intersections. The procedure for calculating the LOS at unsignalized intersections is based on the relative availability of gaps in traffic and the delay experienced for each movement that must yield the right-of-way. The number of gaps is a function of the volume and speed of conflicting traffic, type of control (stop or yield), and intersection geometrics. While the length of average delays and LOS can be calculated for each movement, an overall "weighted" LOS can be calculated and is the basis for analysis of intersection controlled by all-way stop signs.

LOS at unsignalized intersections that are controlled by side street stops is indicative of the magnitude of the delay incurred by motorists turning at the intersection. However, because these calculations exclude the condition of through traffic flow (which is assumed to flow freely), unsignalized poor LOS may not be judged to be an appreciable effect unless the volume of traffic also satisfies warrants for traffic signals.

While the unsignalized LOS may indicate very long delays (e.g., LOS E or F) traffic conditions are generally not assumed to be significant unless a significant number of motorists are delayed. For this analysis, the satisfaction of traffic signal warrants has been used to suggest the significance of unsignalized LOS. Although satisfying signal warrants signifies that an intersection has unacceptable operating conditions, it does not mean that installation of a signal is the only way to mitigate those conditions. It is often possible to improve an intersection with additional lanes or improved geometrics so that signalization is not necessary.

Roundabouts. Caltrans policy regarding applicable traffic controls on state highways is based on Policy Directive 13-02. This directive requires that Caltrans consider the relative merits of alternative traffic controls when it becomes necessary to stop traffic on state highways. Roundabouts LOS is calculated based on HCM delays using SIDRA software.

Traffic Signal Warrants Procedures. Traffic signal warrants are a series of standards which provide guidelines for determining if a traffic signal is appropriate. Because available data are limited to a.m. and p.m. peak hour volumes un-signalized intersections were evaluated using the Peak Hour Warrant (Warrant Number 3) from the California Department of Transportation document *Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)* (MUTCD) (California Department of Transportation 2012). "Urban" analysis criteria were employed based on the speed limit of the effected streets (i.e., $\leq$40 mph).

Intersection Queues. The length of peak period queues at study intersections on Winton Parkway was determined as a byproduct of SimTraffic simulation.

The Synchro/SimTraffic software is intended to be a stochastic model (i.e., randomness is intentionally present when running the simulations). The results for each individual run will vary within each scenario and between scenarios, and this variation may result in some intersections having lower delays and/or shorter queues in the 'Plus Project' scenarios than in the 'No Project' scenarios. This is a normal occurrence for stochastic models, and it is not unexpected that delays or queues could improve at one intersection while increasing at other intersections. The simulation results contained herein reflect the average of the mean 8 one-hour simulation runs selected from a 10-run sample.

Level of Service - Standards. In this study, project-related effects and the need for improvements are based on minimum LOS standards established by agencies responsible for maintaining roadways. The Circulation Element designates LOS C as their minimum standard.

The City of Livingston is in the process of updating its General Plan, and it is possible that the current City policies regarding traffic circulation goals will change as the document responds to the requirements of SB 743. The City may consider Level of Service goals which are more consistent with those adopted by other Merced County communities (i.e., LOS D) or may no longer mandate a minimum standard.

The Caltrans document *Transportation Concept Report – State Route 99 - District 10* (California Department of Transportation 2017) (TCR) identifies LOS D as the concept LOS in rural portions of SR 99 and LOS D as the concept LOS in urban portions. The TCR identifies the portion of SR 99 southeast of Hammatt Avenue as rural, and the portion between Hammatt Avenue and the Winton Parkway as urban. However, Caltrans no longer considers LOS to be a significant impact under CEQA.

More detail on the minimum LOS established by agencies is presented in the *Regulatory Setting* section of this transportation impact study.

Queuing - Standards. Because Caltrans intends to evaluate the safety aspects of the operation of its facilities based on queuing, this analysis identifies the lengths of 95th percentile queues during peak traffic hours for comparison with these elements of circulations system capacity:

- Length of storage available in left turn lanes
- The distance between closely spaced intersections
- The distance between freeway ramp traffic signals and the ramp gore point

An operational / safety issue can arise when estimated queues extend beyond the available distance.

Queuing - Evaluation Criteria. The City of Livingston has not adopted criteria for determining the significance of safety impacts under QECA based on queueing. For this analysis a project's effects could be significant when:

- Project traffic causes the 95th percentile queue to increase by more than 20 feet and causes the queue length to exceed the available storage.

- At locations where the 95th percentile queue already exceeds the available storage, the project causes the queue to lengthen by more than 20 feet (i.e., one car length) or the project increases the background traffic volume by more than 5%.

Existing Traffic Operations

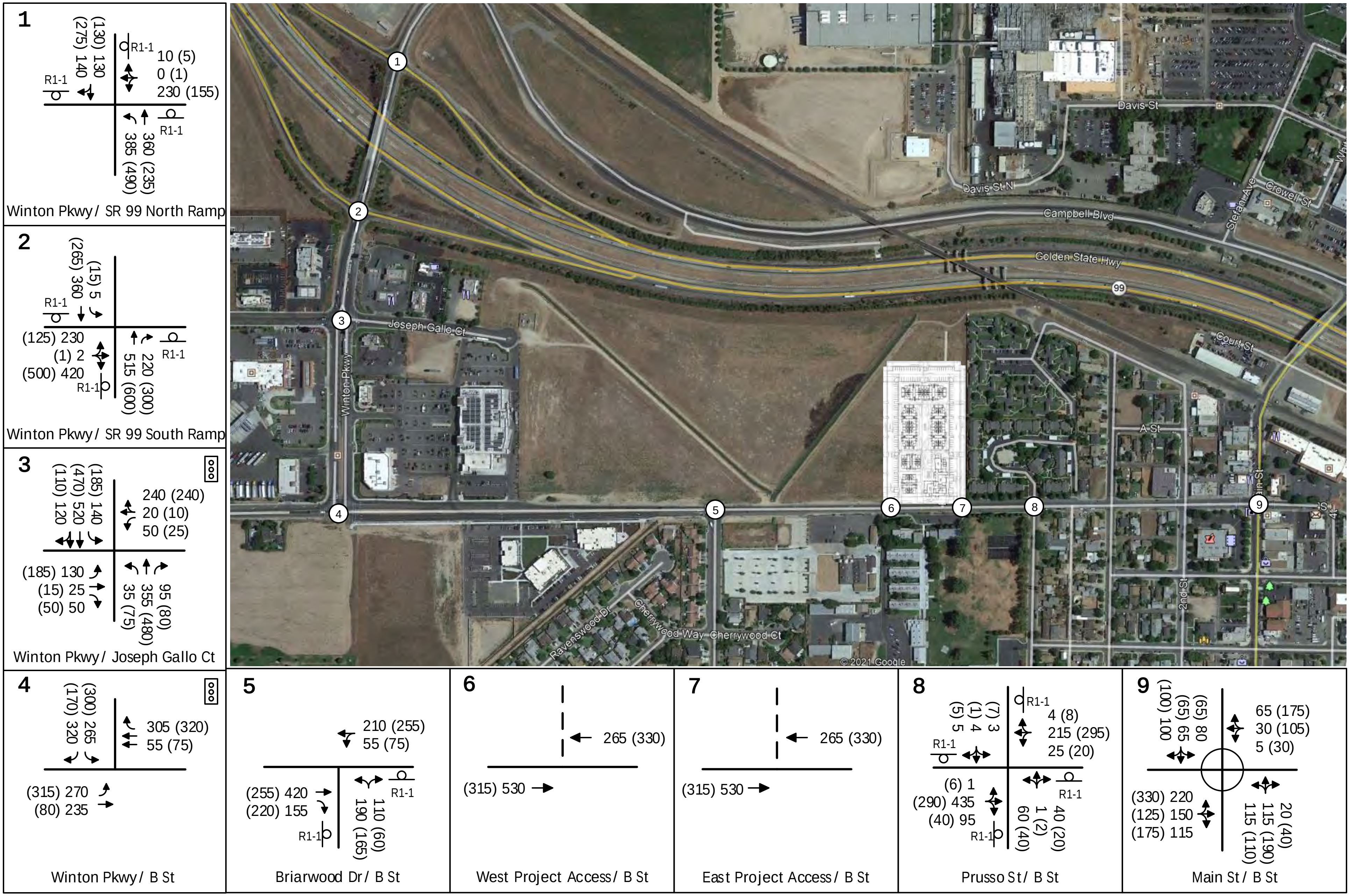
Existing Traffic Volumes. Because COVID-19 has altered local and regional travel patterns since early 2020, is impractical to assume that new traffic counts represent “typical” conditions. In response, Caltrans has required analysis of “pre-COVID conditions. Available peak hour intersection turning movement count data provided by the City of Livingston was reviewed and supplemented with new data in order to create the baseline condition. The most recent traffic count data for this area of Livingston was assembled for the analysis of the *Livingston Community Health Medical Campus Project*[7] (LCHMC). Traffic counts were collected in August 2016 for that document. Data was not available from that analysis for the B Street / Briarwood Drive and B Street / Prusso Street intersections, and new peak hour traffic counts were made at those locations on Tuesday March 17, 2021.

The available data was adjusted to Non-COVID current conditions in order to address the effects of current travel restrictions and growth that has occurred in Livingston since 2016. These steps were taken to produce a conservative estimate of current conditions.

- 2016 traffic volumes were increased by 2% annually (i.e., 10% overall) to account for community growth and to represent a Year 2021 traffic level.
- Because Phase 1 of the LCHMC project has been completed, its trip generation was added to the factored 2016 counts.
- The new traffic counts at Briarwood Drive and Prusso Street were adjusted to balance with traffic volumes at adjoining intersections.

Adjusted current peak hour traffic volume data, as well as current intersection traffic controls and intersection lane geometry, are presented in Figure 3.

[7] Traffic Impact Study for Livingston Community Health Medical Campus in the City of Livingston, Stantec, 9/30/2016



EXISTING TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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0780-19 RA 4/15/2021

figure 3

Current Peak Hour Traffic Operating Conditions – *Levels of Service.* Current traffic operations in terms of LOS, 95th Percentile queues and traffic signal warrants have been determined based on adjusted a.m. and p.m. peak hour traffic volumes. LOS were calculated, and the results of this analysis are presented in Table 4. The LOS calculation worksheets for Existing conditions are presented in the Appendix**.**

The Level of Service analysis makes use of the current intersection geometry to reflect current conditions. The possibility of separate right turns from single lane approaches outside of the traffic waiting to turn was considered based on the available pavement and paved shoulder width. This was the case at the SR 99 Southbound off ramp where some motorists use the shoulder to turn right around vehicles waiting to turn left.

As shown in Table 4, the two analysis methods produce differing Level of Service. HCM based Synchro analysis indicates that the ***Winton Parkway / SR 99 SB ramps intersection*** operates at LOS F in the a.m. and p.m. peak hour. These results (LOS F) are consistent with the LOS reported in the LCHMC traffic study. Conversely, simulation suggested LOS D in the a.m. peak hour and LOS B in the p.m. peak hour.

Similarly, at the ***Winton Parkway / SR 99 NB ramps***, Synchro yields LOS D and simulation yields LOS A and B.

At the ***Winton Parkway / Joseph Gallo Drive*** intersection Synchro yields LOS E in the p.m. peak hour and simulation suggests LOS B. The Synchro results are consistent with the LOS reported in the LCHMC in 2016 (i.e., LOS D approaching LOS E).

The ***B Street / Briarwood Drive*** and ***B Street / Prusso Street*** intersections operate at LOS F in the a.m. peak. These conditions result from the combination of commute traffic from southern Livingston residences and traffic circulation in the areas near Livingston schools. The reported LOS represents the conditions during the peak periods before school, and conditions at other times within the hour are much better.

Levels of Service at other intersections satisfy the City's LOS C minimum under all methods.

To provide a conservative analysis and to be consistent with previous traffic studies prepared for this area of Livingston, LOS reported for subsequent analysis of project effects and assessment of cumulative conditions has been based on Synchro results, while simulation has been used to forecast 95th percentile queue lengths.

Peak Hour Intersection Queues. Table 5 identifies peak hour traffic volumes in key lanes on Winton Parkway and summarizes the length of 95th percentile queues estimated through simulation. The queues at two locations exceed the available storage. At the Winton Parkway / SR 99 NB ramps intersection the queue in the northbound left turn lane is longer than the storage, as in the eastbound left turn lane queue at the Winton Parkway / B Street intersection. The queue on the SR 99 southbound off-ramp does extend back from the intersection but does not reach the freeway mainline.

TABLE 4
EXISTING PEAK HOUR INTERSECTION LEVELS OF SERVICE

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Synchro (HCM)		Simulation		Synchro (HCM)		Simulation	
		Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
Winton Parkway / SR 99 NB ramps	AWS	**26.9**	**D**	11	A	**28.0**	**D**	16	C
Winton Parkway / SR 99 SB ramps	AWS	**89.3**	**F**	29	D	**85.7**	**F**	15	B
Winton Parkway / Joseph Gallo Drive	Signal	25.9	C	15	B	**36.0**	**D**	18	B
Winton Parkway / B Street	Signal	17.1	B	10	A	19.1	B	11	B
B Street / Briarwood Drive	AWS	**58.1**	**F**			14.0	B		
B Street / Prusso Street	AWS	**106.3**	**F**	-		12.6	B	-	
B Street / Main Street	Roundabout[1]	7.2	A			10.8	B		
With Winton Parkway extended to F Street									
Winton Parkway / B Street	Signal	17.6	B			18.2	B		
B Street / Briarwood Drive	AWS	17.4	C	-		9.8	A	-	
B Street / Prusso Street	AWS	**84.5**	**F**			11.6	B		

LOS = Level of Service. AWS is all-way stop control. **Bold** Values Exceed LOS C
[1] Roundabout LOS based on Sidra software

TABLE 5 EXISTING PEAK HOUR INTERSECTION QUEUES							
			AM Peak Hour		PM Peak Hour		
Intersection	Lane	Storage (feet)	Volume (vph)	95th % Queue (feet	Volume (vph)	95th % Queue (feet)	Queue > Storage?
Winton Pkwy / SR 99 NB ramps	Off-ramp	1,240	240	110	161	80	No
	NB left	175	385	120	490	**215**	**Yes**
Winton Pkwy / SR 99 SB ramps	Off-ramp	1,450	650	885	626	470	No
	SB left	210	5	<25	15	40	No
Winton Pkwy / Joseph Gallo Dr	NB left	240	35	60	75	155	No
	SB left	200	140	135	185	175	No
Winton Pkwy / B Street	SB left	330	265	155	300	190	No
	EB left	180	270	170	315	**205**	**Yes**

LOS = Level of Service. AWS is all-way stop control.
Bold Values Exceed available storage

Peak Hour Traffic Signal Warrants. Table 6 summarizes the traffic volumes at unsignalized study intersections and indicates the status of peak hour signal warrants at each location. As shown, both of the SR 99 ramp intersections carry volumes that satisfy peak hour warrants, and the B Street / Briarwood Drive intersection's volumes satisfy warrants in the a.m. peak hour.

It is important to note that simply satisfying a single peak hour warrant may not be sufficient evidence to indicate that a traffic signal is the preferable traffic control action. Caltrans will typically require a full analysis of all nine MUTCD traffic signal warrant categories before making a decision to install a traffic signal. A full warrants analysis is beyond the scope of this report.

TABLE 6 EXISTING PEAK HOUR TRAFFIC SIGNAL WARRANTS				
Intersection	AM Peak Hour		PM Peak Hour	
	Major Volume Minor Volume	Met?	Major Volume Minor Volume	Met?
Winton Pkwy / SR 99 NB ramps	915	**Yes**	1,130	**Yes**
	240		201	
Winton Pkwy / SR 99 SB ramps	1,110	**Yes**	1,180	**Yes**
	650		626	
B Street / Briarwood Dr	840	**Yes**	805	No
	300		225	
B Street / Prusso Street	775	No	659	No
	102	103	91	92

Pedestrian / Bicycle Volumes. The number of pedestrians and bicyclists at intersections near the proposed project was monitored during the new traffic counts conducted on March 17, 2021. As noted in Table 7, the highest number of pedestrians occurred at the B Street / Prusso Street intersection in the morning peak hour when 20 pedestrians used the intersection.

A few bicyclists were also observed. One cyclist was observed in the morning peak hour and 3 were counted in the p.m. peak hour at the B Street / Briarwood Drive intersection. At the B Street / Prusso Street intersection no bicyclists were counted in the a.m. peak hour but 8 passed through the intersection during the p.m. peak hour.

These totals could reflect the effects of COVID-19 on community travel, but lacking supporting data no attempt has been made to adjust the observed volumes.

TABLE 7 EXISTING PEAK HOUR PEDESTRIAN VOLUMES										
	Pedestrians per hour									
			North leg		South leg		East leg		West leg	
Intersection	Time	Total	EB	WB	EB	WB	NB	SB	NB	SB
B Street / Briarwood Dr	AM	0	0	0	0	0	0	0	0	0
	PM	0	0	0	0	0	0	0	0	0
B Street / Prusso St	AM	20	0	1	2	9	1	2	0	0
	PM	7	0	0	2	4	1	0	0	0

Currently Needed Improvements

The nature of improvements currently needed to deliver LOS satisfying the City's LOS C minimum or to reduce identified queue lengths to a level that can be accommodated in available storage has been considered. In this case, Caltrans Policy Directive 13-02 requires that Caltrans first consider roundabouts before other options for traffic controls on state Highway intersections.

Winton Parkway / SR 99 Ramps. As noted later in this report, the 2018 Merced County RTP/SCS identifies undefined improvements to the SR 99 / Winton Parkway interchange (refer to Table 8). Roundabouts could be installed at the SR 99 ramp intersections and would deliver adequate LOS while reducing turn lane queues. However, the feasibility of constructing roundabouts that can accommodate truck turning requirements without reconstructing the overcrossing is unknown. Alternatively, the LCHMC traffic study suggested that traffic signals be installed at the SR 99 ramp intersections. Traffic signals would yield LOS satisfying the City's minimum LOS standard with adequate queueing.

Policy Directive 13-02 requires preparation of an *Intersection Control Evaluation (ICE)* report to determine the preferred traffic control, although the scope of the ICE evaluation can vary (i.e., preliminary or complete ICE report). An ICE report would consider the feasibility of either a traffic signal or roundabout intersection within the context of both short term and long term conditions and would compare the investments required to implement each alternative in terms of right of way and cost. Caltrans may not be able to support installation of a traffic signal at ramp intersections without that analysis.

Improvements Related to B Street Intersections. Traffic conditions at intersections on B Street are influenced by the peak traffic conditions on this main route between the SR 99 / Winton Parkway interchange and southern Livingston's residential areas. Poor traffic conditions occur because local school activity also occurs in this area during the morning peak hour. Extending Winton Parkway beyond B Street would provide an alternative route to southern Livingston in lieu of using Briarwood Drive, Prusso Street and Main Street. Alternatively, as noted later in this report, the 2018 Merced County RTP/SCS identifies a roundabout at the B Street / Prusso Street intersection (refer to Table 8).

Table 4 notes the resulting LOS at B Street intersections if Winton Parkway was extended to F Street and current traffic volumes were redistributed. As shown conditions at the B Street / Briarwood Drive intersection could improve substantially, but while overall delays could be reduced, peak period congestion would likely remain at the B Street / Prusso Street intersection due to school traffic.

REGULATORY SETTING

The following information is a description of the existing regulatory setting conditions in the project study area. While CEQA guidelines govern the overall transportation analysis, the study area includes streets and highways that are governed by various state and local jurisdictions. Each has adopted policies and minimum LOS standards for their facilities.

SB 743

SB 743 governs the application of new CEQA guidelines for addressing transportation impacts based on Vehicle Miles Traveled (VMT).

> ***SB 743.*** Senate Bill 743 (Steinberg, 2013), which was codified in Public Resources Code section 21099, required changes to the guidelines implementing CEQA (CEQA Guidelines) (Cal. Code Regs., Title 14, Div. 6, Ch. 3, § 15000 et seq.) regarding the analysis of transportation impacts. The Governor's Office of Planning and Research (OPR) has proposed, and the California Natural Resources Agency (Agency) has certified and adopted, changes to the CEQA Guidelines that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. With the California Natural Resources Agency's certification and adoption of the changes to the CEQA Guidelines, automobile delay, as measured by "level of service" and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. (Pub. Resources Code, § 21099, subd. (b)(3).)"

The California Governor's Office of Planning and Research (OPR) document *Technical Advisory on Evaluating Transportation Impacts in CEQA* (California Governor's Office of Planning and Research 2018) provides general direction regarding the methods to be employed and significance criteria to evaluate VMT impacts, absent polices adopted by local agencies. At the time this analysis commenced, the City of Livingston and Merced County had not adopted guidelines for analyzing VMT or determining the significance of a project's impact on VMT. The VMT analysis presented herein is not intended to pre-empt any City process of developing and adopting VMT guidelines that may result from the pending General Plan Update. Rather, the analysis presented in this traffic impact study is intended to be a good-faith effort at disclosing and identifying the VMT impacts of the project based on currently available data and guidance.

Caltrans

Caltrans is responsible for state highways, their ramps and for intersections where freeway ramps intersect the local street system. Caltrans generally strives to maintain LOS C on its facilities but recognizes that circumstances may limit their ability to do so. The following three documents are relevant.

Traffic Study Guidelines. The Caltrans document *Transportation Impact Study Guide* (California Department of Transportation 2020) identifies circumstances under which Caltrans determines that a traffic impact study would be required. The document also details information that is to be included in the study, analysis scenarios, and guidance on acceptable analysis methodologies, including CEQA focus on VMT rather than LOS, alternative transportation modes and safety.

State Route 99 Transportation Concept Report. The Caltrans document *Transportation Concept Report – State Route 99 - District 10* (California Department of Transportation 2017) (TCR) is applicable to the highway. A TCR is a long-term planning document that each Caltrans district prepares for every state highway or portion thereof in its jurisdiction. This document usually represents the first step in Caltrans' long-range corridor planning process. The purpose of a TCR is to determine how a highway will be developed and managed so that it delivers the targeted LOS and quality of operations that are feasible to attain over a 20-year period. These are indicated in the "route concept." In addition to the 20-year route concept level, the TCR includes an "ultimate concept," which is the ultimate goal for the route beyond the 20-year planning horizon. Ultimate concepts must be used cautiously, however, because unforeseen changes in land use and other variables make forecasting beyond 20 years difficult. TCRs do not necessarily consider the amount, type, and location of development within local agency General Plans. The SR 99 TCR identifies LOS C as the concept LOS in rural portions and LOS D as the concept LOS in urban portions. In the Livingston area, the portion of SR 99 southeast of Hammatt Avenue is considered rural, and the portion between the Winton Parkway and Hammatt Avenue is considered urban.

Traffic Operations Policy Directive 13-02. Caltrans policy regarding applicable traffic controls has recently been expanded based on Traffic Operations Policy Directive 13-02. This directive requires that Caltrans consider the relative merits of alternative traffic controls when it becomes necessary to stop traffic on state highways. Roundabouts are the default intersection control, but all-way stops and traffic signals are to be considered. The policy directive requires preparation of an *Intersection Control Evaluation (ICE)* to determine the preferred traffic control.

City of Livingston

General Plan. The City of Livingston is responsible for streets within the city limits. The City of Livingston *Circulation Element* of the *General Plan – Livingston, California* (Livingston 1999) designates LOS C as their minimum standard:

> "The City designates Service Level 'C' as defined in the Highway Capacity Manual (published by the Transportation Research Board of the National Research Council) as the minimum desirable service level at which arterial streets and collector streets should operate. All new facilities in these categories shall be designed to operate at this level or better for a period of at least 20 years following their construction."

Merced County Association of Governments

2018 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS). The Merced County Association of Governments (MCAG) has prepared the 2018 update to the

Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)[8] to address current regional goals and priorities. Ultimately this plan seeks to ensure that the Merced County transportation system will continue to operate efficiently over the next 25 years with sufficient capacity to meet demand and that mobility options are available for all of Merced County's residents. The RTP focuses on our regional transportation infrastructure needs, while the SCS addresses planned growth patterns that have been defined by local cities and the County. Linking the RTP and SCS binds these two processes together, ensuring that planned additions and modifications to the regional transportation network are addressing both existing and future needs.

Table 10.2 – 2018 RTP/SCS Tier I Projects List identifies anticipated improvement projects anticipated at various locations in the County, including the Livingston area projects noted in Table 8. Many of these projects are in the immediate environs of the proposed project.

Regional Transportation Impact Fee. The Merced County Association of Governments (MCAG) administers the Regional Transportation Impact Fee (RTIF) program. Many local governments have or are considering development fee programs to mitigate traffic impacts within their jurisdiction. However, transportation impacts beyond their jurisdictions are not included. The Regional Transportation Impact Fee Program provides additional revenue to mitigate transportation impacts on the regional road network. (http://www.mcagov.org/150/Regional-Transportation-Impact-Fee) Currently Livingston and other Merced County cities do not collect this fee.

[8] https://www.mcagov.org/307/2018-RTP

TABLE 8
2018 RTP/SCS TIER I PROJECTS LIST – LIVINGSTON AREA

Jurisdiction	Project	Limits / Description	Type	Year	Cost (mil's)	Funding Sources
Caltrans	SR 99, Livingston Widening	Widen freeway to 6 lanes from Hammatt Avenue to Stanislaus County line	Road Capacity	2024	$75.0	STIP, TCEP (SB1)
Livingston	Livingston Transit Center	Main Street along UP ROW	Transit	2027	$2.9	Measure V
	B Street Corridor Improvements	Winton Parkway to 1st Street	Complete Streets	2022	$3.9	Measure V
	Main Street Corridor Improvements	Swan St to Peach Ave	Complete Streets	2022	$13.0	Measure V
	SR 99 / Winton Pkwy on-ramp widening	SR 99 and Joseph Gallo Dr	Road Op's / Safety	2019	$1.24	Measure V
	Roundabout @ Main St & B St		Road Op's / Safety	2018	$0.554	FTIP
	Winton Pkwy Extension	B Street to F Street	Road Capacity	2025	$5.0	Measure V/SB-1/ STIP/local
	Roadway Rehabilitation	Various Locations	Road Maintenance	2022	$4.4	Measure V/SB-1/ STIP/local
	Infill Sidewalk Program	Various locations	Active (bike/ped)	2023	$2.6	Measure V/SB-1/ STIP/local
	Widen / reconstruct Hammatt Ave and Winton Pkwy interchanges and Main Street crossing with SR 99. Winton Pkwy is the top priority followed by Hammatt Ave		Road Op's / Safety	2020	$15.0	Measure V/SB-1/ STIP/local
	Roundabout - @ Briarwood & B St		Road Op's / Safety	2022	$3.5	Measure V/SB-1/ STIP/local

PROJECT CHARACTERISTICS

Project Description

The project is an 80-unit affordable apartment project. The project proposes two driveways on B Street located 630 feet and 330 feet west of Prusso Street. The project proposes no improvements to B Street.

Trip Generation

Approach. The number of vehicle trips that are expected to be generated by development of the project has been estimated based on trip generation rates that are applicable to the nature and size of project land uses. Specific trip generation rates published by the Institute of Transportation Engineers (ITE) were used.

Trip Generation Rates. Trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* have been employed, as noted in Table 9. The actual estimate was developed from regression curves included in the manual for this land use.

Trip Generation Forecasts. Identified trip generation rates were applied to the project, and as indicated, the project is expected to generate 586 daily trips (i.e., ½ inbound and ½ outbound). On a peak hour basis the project is expected to generate 39 trips in the a.m. peak commute hour and 48 trips during the p.m. peak commute hour.

TABLE 9
ITE TRIP GENERATION RATES / FORECASTS

Land Use	ITE Code	Unit	Trips per Unit						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Multi-Family Housing Low Rise	220	dwelling	7.32	23%	77%	0.49	63%	37%	0.60
Tierrasanta Village Apartments	220	80 du	586	9	20	39	30	18	48

Trip Distribution

The geographic distribution of project-related trips used in this analysis is based on consideration of the nature of the proposed uses and the typical purposes of trips generated by residential projects.

As a residential project, many morning trips will be oriented schools, while in the evening the share of trips destined for retail centers would be higher. Commute traffic to and from employment would occur in both time periods. Table 10 summarizes the trip distribution assumptions made based on our knowledge of the Livingston area and assumptions that have been made for previous residential projects.

TABLE 10
TRIP DISTRIBUTION ASSUMPTIONS

Direction	Route	Percent of Total Trips	
		AM Peak Hour	PM Peak Hour
North	Main Street beyond B Street[1]	25%	25%
West	State Route 99 beyond Winton Parkway	15%	20%
	B Street beyond Winton Parkway	10%	5%
	Joseph Gallo Drive	5%	5%
	Joseph Gallo Court	5%	5%
	Livingston Commons SC	10%	15%
South	Livingston south of B Street	20%	15%
East	B Street beyond Main Street	10%	10%
Total		**100%**	**100%**

[1] includes trips on SR 99 south via Hammatt Ave Interchange

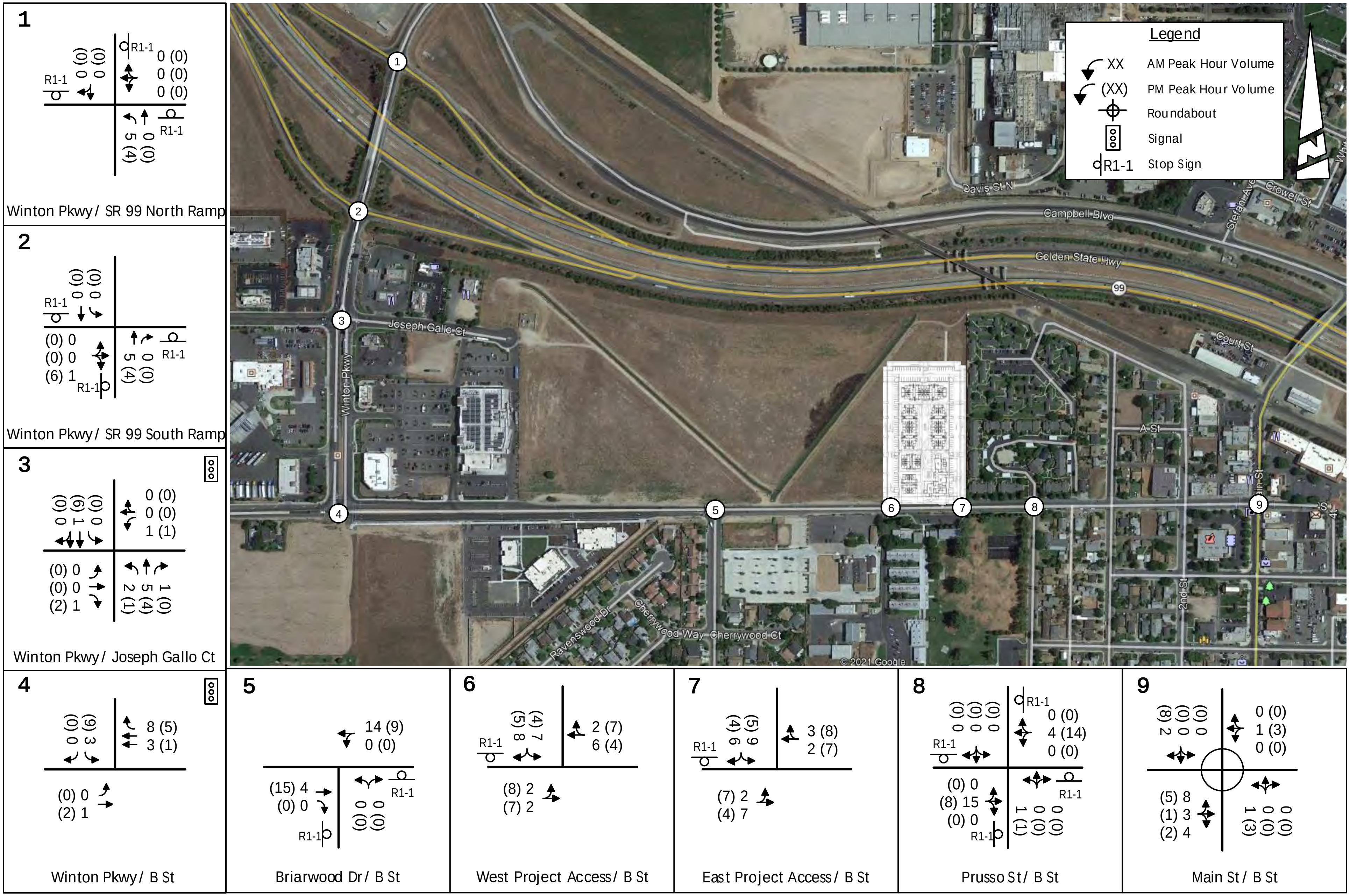
Trip Assignment. The trips generated by Phase 1 of the project were assigned to the study area street system based on the location of site access, the regional distribution patterns noted previously and the relative time along alternative routes. Figure 4 presents the resulting project trip assignment.

Other Transportation Modes

While the project will generate automobile traffic, some travel will be made using other transportation modes. These issues are instructed below and discussed in the CEAQ Impact analysis.

Pedestrians / Bicyclists. It is likely that some residents will travel on foot or by bicycle, particularly to reach destinations that are relatively close to the site. For example, Rancho San Miguel Market and the balance of the Winton Parkway area retail uses are less than ½ mile away, and the B Street commercial area beyond Main Street is a similar distance to the east. A residential project of this size would likely be home to 60 to 70 school age children (TK-12), and while Livingston High School and Livingston Middle School are each about a mile away other local schools are very close. The project is likely to generate pedestrians and bicyclists walking along the north side of B Street and/or crossing the street.

Transit Users. The project's residents would be candidates for transit service that already travel along B Street in the area of the project.



PROJECT ONLY TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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0780-19 RA 4/15/2021

figure 4

CEQA TRANSPORTATION IMPACTS

Vehicle Miles Traveled (VMT) Analysis

VMT refers to the amount and distance of vehicle travel attributable to a project. VMT generally represents the number of vehicle trips generated by a project multiplied by the average trip length for those trips. For CEQA transportation impact assessment, VMT is to be calculated using the origin-destination VMT method, which accounts for the full distance of vehicle trips with one end from the project.

Because the City of Livingston has not yet adopted guidelines or policies for dealing with VMT, the California Governor's Office of Planning and Research (OPR) document *Technical Advisory on Evaluating Transportation Impacts in CEQA* (California Governor's Office of Planning and Research 2018) provides general direction regarding the methods to be employed and significance criteria to evaluate VMT impacts, absent polices adopted by local agencies. The directive addresses several aspects of VMT impact analysis, and is organized as follows:

- ***Screening Criteria***: Screening criteria are intended to quickly identify when a project should be expected to cause a less-than-significant VMT impact without conducting a detailed study.
- ***Significance Thresholds***: Significance thresholds define what constitutes an acceptable level of VMT and what could be considered a significant level of VMT requiring mitigation.
- ***Analysis Methodology***: These are the potential procedures and tools for producing VMT forecasts to use in the VMT impact assessment.
- ***Mitigation***: Projects that are found to have a significant VMT impact based on the adopted significance thresholds are required to implement mitigation measures to reduce impacts to a less than significant level (or to the extent feasible).

Screening Criteria. Screening criteria can be used to quickly identify whether sufficient evidence exists to presume a project will have a less than significant VMT impact without conducting a detailed study. However, each project should be evaluated against the evidence supporting that screening criteria to determine if it applies. Projects meeting at least one of the criteria below can be presumed to have a less than significant VMT impact, absent substantial evidence that the project will lead to a significant impact.

The extent to which the proposed project qualifies under each criterion is noted.

- ***Small Projects:*** Defined as a project that generates 110 or fewer average daily vehicle trips.
- ***Affordable Housing:*** Defined as a project consisting of deed-restricted affordable housing.
- ***Local Serving Retail***: Defined as retail uses of 50,000 square feet or less can be presumed to have a less than significant impact.
- ***Projects in Low VMT-Generating Area:*** Defined as a residential or office project that is in a VMT efficient area based on an available VMT Estimation Tool. The project must be consistent in size and land use type (i.e., density, mix of uses, transit accessibility, etc.) as the surrounding built environment.

- ***Proximity to High Quality Transit.*** The directive notes that employment and residential development located within ½ mile of a high-quality transit corridor can be presumed to have a less than significant impact.

Evaluation. The extent to which the proposed project's VMT impacts can he presumed to be less than significant has been determined based on review of the OPR directive's screening criteria and general guidance.

The OPR ***Small Project*** criteria is not applicable to this project. The project is projected to generate 586 daily vehicle trips. As the 110 ADT threshold for automobiles is exceeded, the project's VMT impacts cannot be presumed to be less than significant based on this criteria.

The OPR directive provides this explanation for a Presumption of Less Than Significant Impact for ***Affordable Residential Development***

> Adding affordable housing to infill locations generally improves jobs-housing match, in turn shortening commutes and reducing VMT.24,25 Further, "… low-wage workers in particular would be more likely to choose a residential location close to their workplace, if one is available." In areas where existing jobs-housing match is closer to optimal, low income housing nevertheless generates less VMT than market- rate housing. Therefore, a project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT. Evidence supports a presumption of less than significant impact for a 100 percent affordable residential development (or the residential component of a mixed-use development) in infill locations. Lead agencies may develop their own presumption of less than significant impact for residential projects (or residential portions of mixed use projects) containing a particular amount of affordable housing, based on local circumstances and evidence. Furthermore, a project which includes any affordable residential units may factor the effect of the affordability on VMT into the assessment of VMT generated by those units.

The proposed Tierrasanta Village project is designated an affordable housing development, and based on OPR guidance, its impact based on VMT is less than significant. This conclusion is supported by the project's close proximity to retail services and schools, as well as the location of existing transit services.

The City of Livingston and Merced County have not yet identified ***Low VMT generating locations*** within their jurisdiction, so this screening criteria is not applicable

While The Bus service is available in the vicinity of the project, the current transit service does not meet the OPR definition of ***High Quality Transit,*** which requires service on 15 minute headways. This criteria is not applicable.

Conclusion. The project's impact to regional VMT is not significant.

Multi-Modal Impacts

The significance of the project's Multi-Modal impacts is discussed in the text which follows.

Transit Service and Facilities. The Bus routes follow B Street, and while the project adds additional driveways and traffic on B Street, the project does not physically disrupt an existing transit service or facility nor interfere with implementation of a planned transit service or facility. The project's traffic contribution to roads that are used by The Bus would be too small to result in increased travel time for busses that adversely effects on-time performance. While the project would likely generate some transit riders, based on current uses of the routes through Livingston, if the projects ridership followed current patterns, the project would not result in increased transit ridership demands that result in passenger loads that exceed vehicle loading standards. As the project access is not adjacent to any transit facility, the project does not result in increased potential for safety conflicts involving transit vehicles and other modes of travel.

Conclusion. The project's impact to Transit Service and Facilities is not significant.

Bicycle Facilities. The project does not interfere with use of the existing Class II bike lanes on B Street. The project submittal does not indicate that project proposes to widen B Street in a manner that would allow Class 2 bike lanes to be installed in the future, but because there is no City adopted Bicycle Plan, the Tierrasanta Village project does not physically disrupt an existing bicycle facility or interfere with implementation of a planned bicycle facility. Some project residents may elect to ride bicycles to retail destinations, employment and schools. With the exception of the bike lanes on B Street west of the project, project cyclists would mix with automobiles on Livingston's streets, as is the case today throughout the community. The amount of project bicycle travel has been considered. In communities with much more developed bicycle facilities 5% of the residentially generated person trips could be made by bicycle. At that very conservative rate 60 to 80 daily bicycle trips could be made by this project. This level of use would not result in a significant increase in bicyclists on a facility that does not have adequate bicycle facilities, such that conflicts between bicyclists and other travel modes are likely to increase.

Conclusion. The project's impact to Bicycle Facilities is not significant.

Pedestrian Facilities. The project submittal does not indicate that the project proposes to make frontage improvements on B Street that would include sidewalks, and the site plan notes a "public entry" that extends towards B Street. The project does not physically disrupt an existing pedestrian facility. It is very likely that some residents will travel on foot to reach destinations that are relatively close to the site, such as Rancho San Miguel Market and the balance of the Winton Parkway area retail uses, as well as the B Street commercial area beyond Main Street. A residential project of this size would likely be home to 60 to 70 school age children (TK-12), and the project is likely to generate school age pedestrians across B Street during busy times before and after school.

The adequacy of existing facilities to accommodate the project's pedestrian demand has been considered. When walking westerly from the site there is no sidewalk on the north side of B Street for about 1,600 feet until the sidewalk along the Livingston Commons SC site. Tierrasanta

Village residents would have to walk along the unimproved shoulder and the potential for conflicts between automobiles and pedestrians exists. This would be the same path followed by Casitas Del Sol community residents walking in that direction. However, as no pedestrians were counted on the north side of B Street in data collection, the number of pedestrians currently walking along the north side of B Street appear to be very low. While construction of an all-weather pedestrian route to Livingston Commons SC that was separated from vehicle traffic would be desirable, the project's impact based on pedestrian activity in this area is not a significant safety impact and mitigation is not required.

Conversely, school age children will cross B Street at the existing school zone crosswalk at Prusso Street. While this location will provide a safe crossing, sidewalk should be installed along the project's frontage to ensure that all residents have safe access to the crossing and to ensure that future development along B Street west of the project is not cut off from the crossing. With that improvement the project does not result in an increased presence of vehicles and/or pedestrians on a facility that does not have adequate pedestrian facilities, such that conflicts between pedestrians and other travel modes are likely to increase, nor does the project interfere with the future implementation of planned facilities.

Conclusion. The project's impact to Pedestrian Facilities is not significant.

Roadway Design and Users. As addressed in the LTA, the project would not substantially increase hazards to vehicle safety due to increased traffic at locations with geometric design features (e.g., sharp curves or dangerous intersections). Regular site traffic and vehicles visiting the site during construction will be comprised of automobiles and trucks permitted under the California Vehicle Code (CVC) and no farm equipment is expected. The project does not introduce incompatible users (e.g., farm equipment) to a roadway or transportation facility not intended for those users.

Conclusion. The project's impact with regards to Roadway Design and Users is not significant.

State Highways. The project will add a small amount traffic to Interstate 99 and to its ramps on Winton Parkway, as addressed in the traffic operational analysis. While the project incrementally increases length of queues at the interchange the Tierrasanta Village project does not by itself cause safety impacts based on queueing. However, as noted in the LTA's cumulative analysis, the development of other approved / pending projects, along with Tierrasanta Village will cause queues that extend onto mainline SR 99 or otherwise exceed available storage at the interchange. Tierrasanta Village traffic would cause those queues to lengthen by more than one vehicle, and this would exceed the identified significance criteria.

Conclusion. The project's cumulative impact with regards to safety on State facilities is significant, and mitigation is required.

Mitigation. The project should contribute its fair share to the local share of the cost of SR 99 / Winton Parkway interchange improvements identified in the LTA. The local share would be the total coast less any reasonably assured contribution of public funds as noted in the 2018 RTP/STS.

TRAFFIC OPERATIONAL EFFECTS

Traffic Operations Analysis

Traffic volumes associated with the Tierrasanta Village Apartments were superimposed onto current background traffic to create the Existing plus Project condition shown in Figure 5 for a.m. and p.m. peak hour traffic volumes.

Existing Plus Project Peak Hour Intersection Level of Service. Resulting Existing Plus Project peak hour LOS are presented in Table 11. The Synchro LOS calculation worksheets for Existing Plus Project conditions are presented in the Appendix.

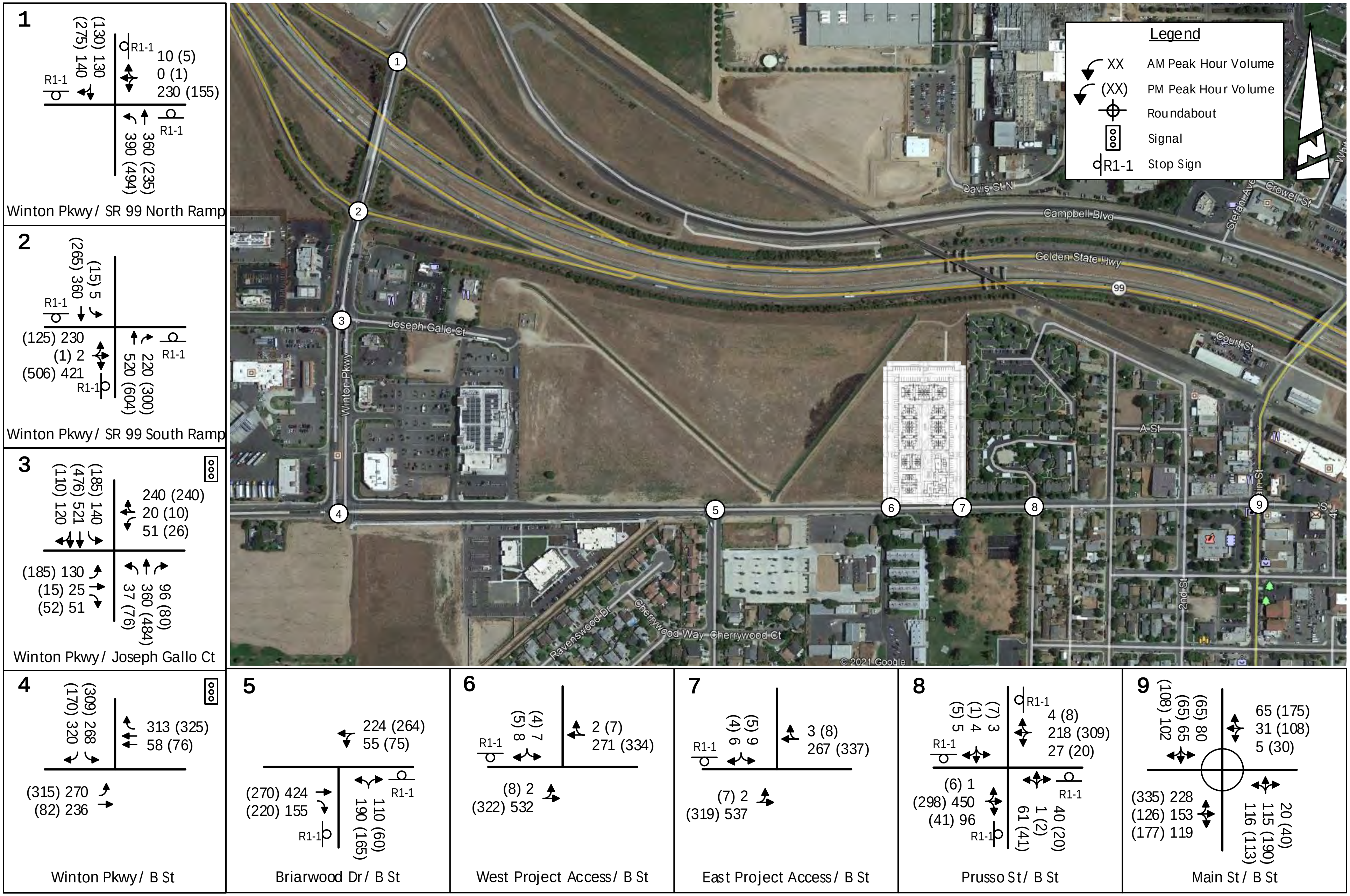
As shown, the addition of project generated traffic results in incrementally longer delays at study intersections but does not result in any additional location operating with a Level of Service that exceeds the City's minimum LOS C standard.

The same improvements identified to achieve LOS C for existing conditions remain needed under existing plus project conditions.

Existing Plus Project Queues. Table 12 presents the traffic volumes occurring in key lanes at intersections on Winton Parkway along with projected 95th percentile queues. As shown while development of the project could alter the length of queue identified through simulation, no additional locations will carry queues that exceed available storage. At locations where queues already exceed storage, the project does not increase the queue length by more than 20 feet and does not increase the peak hour volume by more than 5%.

Existing Plus Project Traffic Signal Warrants. Existing Plus Project traffic volumes have been compared to peak hour traffic signal warrant requirements. As was noted in Table 13, the two SR 99 ramp intersections would continue to carry volumes that satisfy peak hour warrants, and the B Street / Briarwood Drive intersection would continue to satisfy peak hour warrants during the a.m. peak hour. The project does not result in any additional location satisfying peak hour warrants.

The City of Livingston has previously required that development projects adding traffic to locations that already satisfy peak hour traffic signal warrants contribute their fair share to the cost of traffic signals.



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EXISTING PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

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figure 5

TABLE 11 EXISTING PLUS PROJECT PEAK HOUR INTERSECTION LEVELS OF SERVICE									
		AM Peak Hour				PM Peak Hour			
		Existing		Existing Plus Project		Existing		Existing Plus Project	
Intersection	**Control**	**Average Delay (sec/veh)**	**LOS**	**Average Delay (Sec/veh)**	**LOS**	**Average Delay (sec/veh)**	**LOS**	**Average Delay (sec/veh)**	**LOS**
Winton Parkway / SR 99 NB ramps	AWS	**26.9**	**D**	**27.5**	**D**	**28.0**	**D**	**28.6**	**D**
Winton Parkway / SR 99 SB ramps	AWS	**89.3**	**F**	**90.9**	**F**	**85.7**	**F**	**88.4**	**F**
Winton Parkway / Joseph Gallo Drive	Signal	25.9	C	26.0	C	**36.0**	**D**	**36.1**	**D**
Winton Parkway / B Street	Signal	17.1	B	17.4	B	19.1	B	19.5	B
B Street / Briarwood Drive	AWS	**58.1**	**F**	**62.3**	**F**	14.0	B	14.5	B
B Street / Prusso Street	AWS	**106.3**	**F**	**119.0**	**F**	12.6	B	13.1	B
B Street / Main Street	Roundabout	7.2	A	7.4	A	10.8	B	11.0	B
B Street / West Access Southbound approach	SB Stop	-		16.2	C	-		12.7	B
B Street / East Access Southbound approach	SB Stop	-		24.3	C	-		13.6	B

LOS = Level of Service. AWS is all-way stop control. **Bold** Values Exceed LOS C

TABLE 12
EXISTING PLUS PROJECT PEAK HOUR INTERSECTION QUEUES

Intersection	Lane	Storge (feet)	AM Peak Hour				PM Peak Hour				Queue > Storage?
			Existing		Existing Plus Project		Existing		Existing Plus Project		
			Volume (vph)	95th % Queue (feet	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	Volume (vph)	95th % Queue (feet)	
Winton Pkwy / SR 99 NB ramps	Off-ramp	1,240	240	110	240	120	161	80	161	80	No
	NB left	175	385	120	390	100	490	**215**	494	**210**	**Yes**
	Total vol[1]		1,255		1,260		1,291		1,495		
Winton Pkwy / SR 99 SB ramps	Off-ramp	1,450	650	885	651	1,040	626	470	632	425	No
	SB left	210	5	<25	5	55	15	40	15	40	No
	Total vol		1,752		1,758		1,806		1,816		
Winton Pkwy / Joseph Gallo Dr	NB left	240	35	60	37	65	75	155	76	90	No
	SB left	200	140	135	140	150	185	175	185	190	No
	Total vol		1,780		1,791		1,925		1,939		
Winton Pkwy / B Street	SB left	330	265	155	268	165	300	190	309	200	No
	EB left	180	270	170	270	185	315	**205**	315	**215**	**Yes**
	Total vol		1,450		1,465		1,260		1,277		

LOS = Level of Service. AWS is all-way stop control. **Bold** values exceed available storage
[1] Total vol is the total volume entering the intersection

TABLE 13
EXISTING PLUS PROJECT PEAK HOUR TRAFFIC SIGNAL WARRANTS

Intersection	AM Peak Hour: Existing Major / Minor	AM Existing Met?	AM Peak Hour: Existing Plus Project Major / Minor	AM Existing Plus Project Met	PM Peak Hour: Existing Major / Minor	PM Existing Met?	PM Peak Hour: Existing Plus Project Major / Minor	PM Existing Plus Project Met?
Winton Pkwy / SR 99 NB ramps	915	**Yes**	920	**Yes**	1,130	**Yes**	1,134	Yes
	240		240		201		201	
Winton Pkwy / SR 99 SB ramps	1,110	**Yes**	1,115	**Yes**	1,180	**Yes**	1,184	Yes
	650		661		626		632	
B Street / Briarwood Dr	840	**Yes**	858	**Yes**	805	No	829	No
	300		300		225		225	
	1,140[1]		1,158[1]		1,030[1]		1,054[1]	
B Street / Prusso Street	775	No	796	No	659	No	682	No
	102		103		91		92	
	877[1]		899[1]		750[1]		774[1]	

[1] Total volume entering the intersection

CUMULATIVE CONDITIONS OPERATIONAL ANALYSIS

This section of the transportation impact study describes traffic operating conditions under long-term future cumulative conditions. This scenario provides a description of background long-term future conditions and, in comparison with the Cumulative Plus Project condition, allows identification of project-related effect under cumulative conditions.

Approach

Section 15355(a) of the *State CEQA Guidelines* states,

> "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

Cumulative traffic volume forecasts were prepared using a method consistent with Section 15130(b)(1)(A) of the *State CEQA Guidelines*, which states cumulative impact may be assessed using "A list of past, present, and probable future projects producing related or cumulative impacts, . . ."

It is acknowledged that the City of Livingston is currently preparing an update to its General Plan. The General Plan Update will be accompanied by an EIR that may disclose long term traffic operations. However. that information is not currently available.

Approved Projects. The background projects assumed for this analysis were identified in consultation with City of Livingston staff and represent those development projects likely to add traffic the study area. The projects and traffic volumes presented in the traffic study for the approved Arco at Campbell Blvd & Hammatt Avenue[9] were assumed but were supplemented with additional future projects presented in the pending Sanghera Apartments traffic study[10]. The pending Moonglo Truck Stop at the SR 99 / Hammatt Avenue interchange is also included in this analysis. These projects are noted in Table 14.

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[9] *Final Initial Study/Mitigated Negative Declaration for the Hammatt Avenue ARCO Project - Livingston, CA* (BaseCamp Environmental, Inc. 2019)

[10] *Traffic Impact Analysis for the Sanghera Apartments (KDA 2020).*

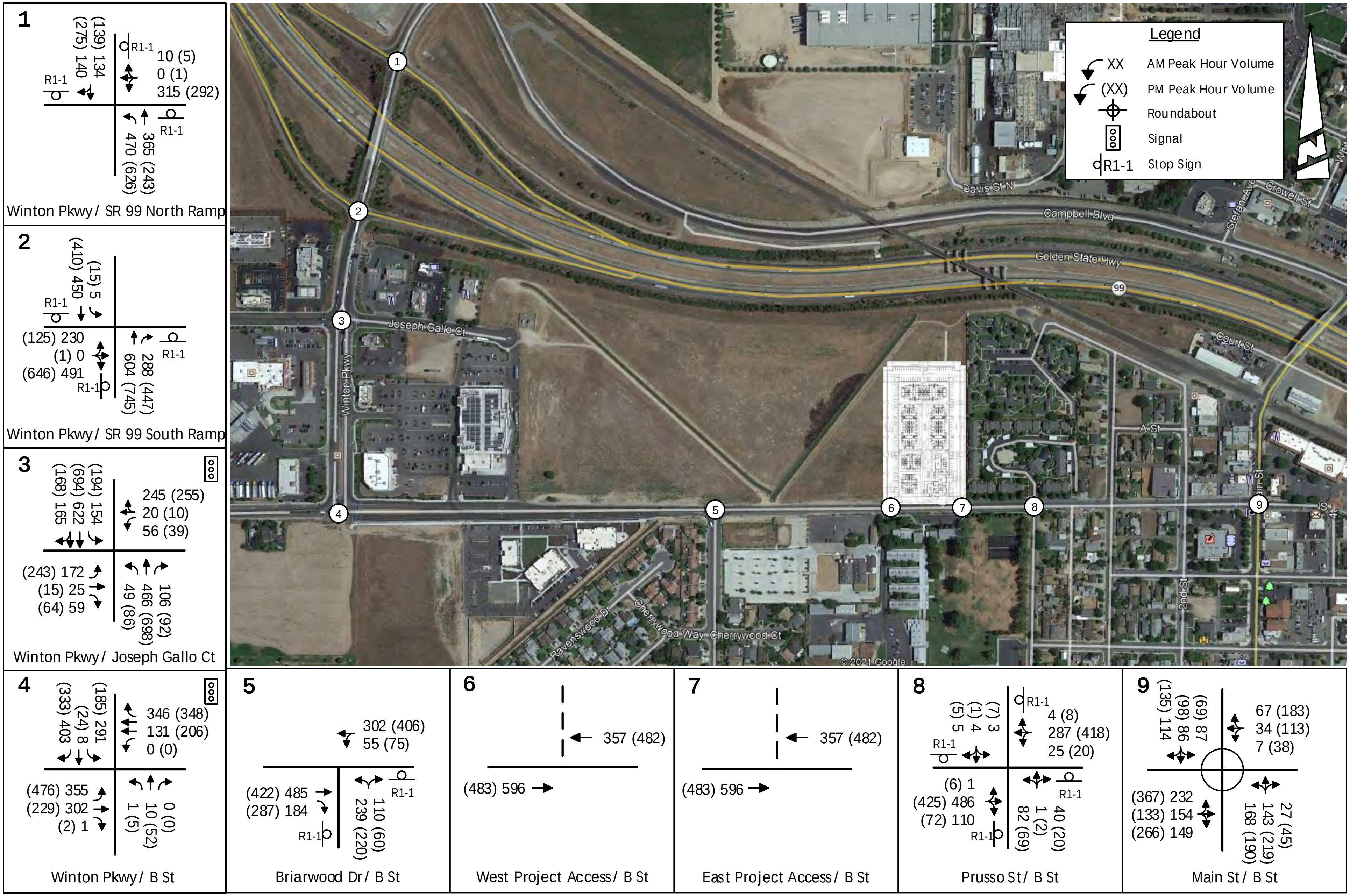
TABLE 14 APPROVED PENDING PROJECTS LIST			
Project	**Location**	**Type**	**Quantity**
ARCO Traffic Study Projects			
Liberty Square – Manzanita Homes	East side of Hammatt Ave, north of Walnut	SFR	23 lots
Kishi – Manzanita Homes	Both sides of Hammatt Ave, north of Walnut	SFR	151 lots
Country Villas IV	S.E. corner of Trigger Lane & Walnut Avenue	SFR	66 lots
La Tierra (Rancho Estrada)	F Street and Robin Street	SFR	41 lots
Mansionettes at Davante Villas	South of F Street , east of Bridgeport Village	SFR	21 lots
Sun Valley Estates	13311 W. Peach	SFR	111 lots
9-lot Gallo Commercial Center	NE of intersection of Robin Ave and B St	Comm	15.9 acres
Livingston Community Health – Phase 2	B Street east of Winton Pkwy	Office	12.28 ac
Future Pad	Winton Pkwy & Joseph Gallo Dr	Comm	
Lupita's Auto Sales Building	F Street and Hammatt Ave	Comm	6.0 ksf
Moreno Duplexes	832 7th St	MFR	2 units
ARCO AM/PM	SW corner of Hammatt Ave & Campbell Blvd	Comm	2.37 ac
Sanghera Apartments Traffic Study			
Restaurant	Walnut Avenue & Hammatt Avenue	Comm	1.25 ksf
Industrial Laundry	Campbell Blvd & Industrial Drive	ind	83.5 ksf
Automobile Sales	Campbell Blvd / East Avenue	Comm	1.26 ksf
Sanghera Apartments	Main Street & Peach Avenue	MFR	450 units
Moonglo Truck Stop			
Truck Stop	Campbell Blvd & Hammatt Avenue	Comm	12.9 ksf
Tire Store		Comm	4.2 ksf
Quick Serve Restaurants (3)		Comm	8.2 ksf
Currently pending projects: Total trip generation of approved and pending projects is 972 a.m. and 1,577 p.m. peak hour trips.			

Traffic Volumes

Trip generation, trip distribution and traffic assignment for the future projects were developed using data from the three traffic studies. The approved and pending projects list was found to generate 972 a.m. and 1,577 p.m. peak hour trips.

Application of the methods described above results in long-term future Cumulative No Project peak hour traffic volumes presented in Figure 6.

The Cumulative Plus Project conditions have also been developed by superimposing project trips onto the background condition. Resulting Cumulative plus Project volumes are shown in Figure 7.



CUMULATIVE NO PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS WITHOUT WINTON PARKWAY EXTENSION

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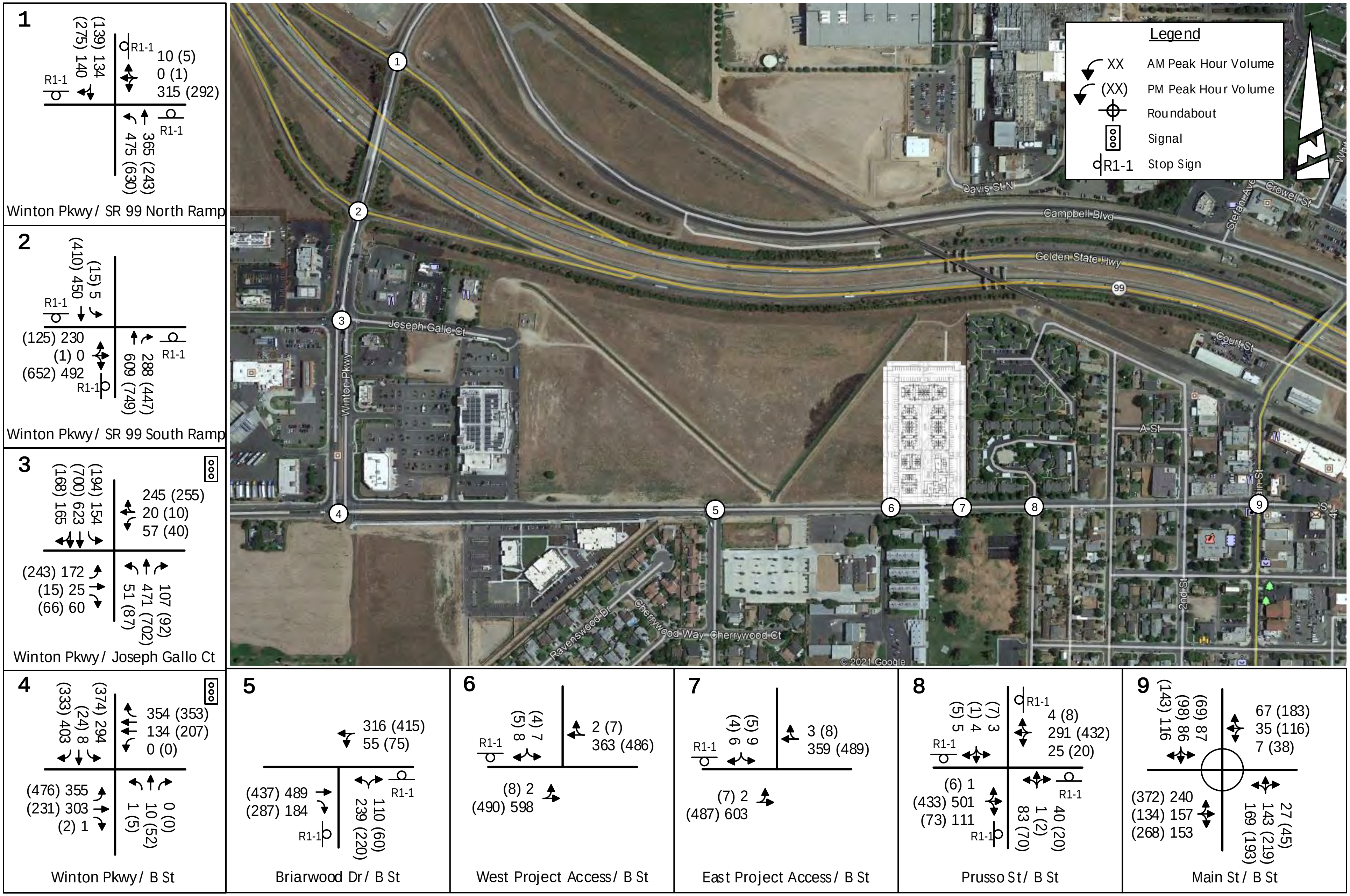
figure 6



CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS
WITHOUT WINTON PARKWAY EXTENSION

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figure 7

Future Traffic Operating Conditions – No Project

Potential Circulation System Improvements. While several improvements to the study area circulation system area are included in the list of 2018 RTP Tier 1 projects, the status of potential local improvements is uncertain. This analysis assumes that no improvements to intersections at the SR 99 / Winton Parkway interchange are made. While Phase 2 of LCHMC will construct Winton Parkway along its frontage, that work will not extend Winton Parkway to F Street. Alternatively, based on the information contained in the RTP, it is reasonable to assume that SR 99 will be widened to 6- lanes through Livingston under Cumulative conditions.

Intersection Levels of Service. Projected Levels of Service at study area intersections with and without the Tierrasanta Village Apartments are noted in Table 15. As indicated, if the other development projects proceed as assumed with no improvements, then all of the study intersection would operate with Level of Service that exceed the General Plan's LOS C minimum standard.

Measures to provide satisfactory traffic operations are to a degree dependent on the southerly extension of Winton Parkway. Regardless of whether Winton Parkway is extended traffic signals with auxiliary lanes or roundabout intersections would be required at the SR 99/ Winton Parkway interchange ramp intersections, but the extent of improvement needed at intersections on B Street will change. More information regarding cumulative improvements is included in the section title "Long Term Improvements".

Intersection Queues. As indicated in Table 16, if background development occurs and no improvements are made, then long queues are forecast at many locations regardless of the development of the Tierrasanta Village Apartments. Most importantly, the queue of traffic on the SR 99 SB off-ramp will extend beyond the limits of the off-ramp and into the mainline freeway. This is a significant safety issue. In addition to the ramp intersection improvements noted above, the traffic signals on Winton Parkway would need to be coordinated to reduce queue lengths in problem locations.

Peak Hour Traffic Signal Warrants. Table 17 summarizes the traffic volumes at unsignalized study intersections and indicates the status pf peak hour signal warrants at each location under cumulative conditions. As shown the SR 99 ramp intersections carry volumes that satisfy peak hour warrants, and the B Street / Briarwood Drive intersection's volumes satisfy warrants in the a.m. peak hour.

TABLE 15 CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION LEVELS OF SERVICE									
		AM Peak Hour				PM Peak Hour			
		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
Intersection	Control	Average Delay (sec/veh)	LOS	Average Delay (Sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
Winton Parkway / SR 99 NB ramps	AWS	**60.4**	**F**	**61.3**	**F**	**90.3**	**F**	**92.0**	**F**
Winton Parkway / SR 99 SB ramps	AWS	**158.4**	**F**	**160.2**	**F**	**189.9**	**F**	**192.6**	**F**
Winton Parkway / Joseph Gallo Drive	Signal	**35.1**	**D**	**35.3**	**D**	**51.1**	**D**	**51.2**	**E**
Winton Parkway / B Street	Signal	**39.0**	**D**	**40.4**	**D**	**103.7**	**F**	**109.7**	**F**
B Street / Briarwood Drive	AWS	**122.5**	**F**	**127.2**	**F**	**37.9**	**E**	**42.1**	**E**
B Street / Prusso Street	AWS	**185.8**	**F**	**200.4**	**F**	**33.7**	**D**	**37.2**	**D**
B Street / Main Street	roundabout	8.8	A	9.0	A	16.8	C	17.3	C
B Street / West Access	SB Stop	-		20.1	C	-		16.7	C
B Street / East Access	SB Stop	-		**34.6**	**D**	-		18.9	C

LOS = Level of Service. AWS is all-way stop control. **Bold** Values Exceed LOS C

TABLE 16 CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION QUEUES											
			AM Peak Hour				PM Peak Hour				
			Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project		
Intersection	**Lane**	**Storge (feet)**	**Volume (vph)**	**95^{th} % Queue (feet**	**Volume (vph)**	**95^{th} % Queue (feet)**	**Volume (vph)**	**95^{th} % Queue (feet)**	**Volume (vph)**	**95^{th} % Queue (feet)**	**Queue > Storage?**
Winton Pkwy / SR 99 NB ramps	Off-ramp	1,240	325	300	325	440	298	145	298	230	No
	NB left	175	470	175	475	**205**	626	**335**	630	**700**	**Yes**
	Total Vol[1]		1,434		1,439		1,581		1,585		
Winton Pkwy / SR 99 SB ramps	Off-ramp	1,450	721	**>1,450**	722	**>1,450**	772	**>1,450**	778	**>1,450**	**Yes**
	SB left	210	5	155	5	155	15	160	15	125	No
	Total Vol		2,068		2,074		2,389		2,399		
Winton Pkwy / Joseph Gallo Dr	NB left	240	49	165	51	185	86	**395**	87	**375**	**Yes**
	SB left	200	154	160	154	160	194	200	194	**230**	**Yes**
	Total vol		2,139		2,150		2,558		2,572		
Winton Pkwy / B Street	SB left	330	291	205	294	225	365	255	374	270	No
	EB left	180	355	**225**	355	**230**	476	**320**	476	**285**	**Yes**
	Total Vol		1,848		1,855		2,040		2,057		

LOS = Level of Service. AWS is all-way stop control. **Bold** Values Exceed available storage
[1] Total vol is total volume entering the intersection

TABLE 17
CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC SIGNAL WARRANTS

	AM Peak Hour				PM Peak Hour			
	Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
Intersection	**Major** / **Minor**	**Met?**	**Major** / **Minor**	**Met**	**Major** / **Minor**	**Met?**	**Major** / **Minor**	**Met?**
Winton Pkwy / SR 99 NB ramps	1,109	**Yes**	1,114	**Yes**	1,283	**Yes**	1,134	**Yes**
	325		325		298		201	
Winton Pkwy / SR 99 SB ramps	1,347	**Yes**	1,352	**Yes**	1,617	**Yes**	1,184	**Yes**
	721		722		772		632	
B Street / Briarwood Dr	1,026	**Yes**	1,044	**Yes**	1,190	**Yes**	1,214	**Yes**
	349		349		280		280	
	1,375[1]		1,393[1]		1,470[1]		1,494[1]	
B Street / Prusso Street	913	No	933	No	949	No	972	No
	123		124		91		92	
	1,048[1]		1,069[1]		1,053[1]		1,077[1]	

[1] total volume entering intersection

LONG TERM IMPROVEMENTS

The extent of improvements needed to deliver traffic operations satisfying General Plan minimum standards and ensuring safe operation of the state highway system has been considered. Within that context, traffic conditions in this area will be influenced by the construction circulation system improvements that may alter current travel patterns, most notably the Winton Parkway Extension.

Cumulative Traffic Conditions Winton Parkway Extension

Traffic Volumes with Winton Parkway Extended to F Street. To develop traffic volume forecasts with the Winton Parkway extension current peak hour traffic volumes on B Street were redistributed to reflect the completion of Winton Parkway between B Street and F Street. Subsequently, the trips associated with approved and pending projects were reassigned assuming that roadway was available. Figure 8 presents the resulting peak hour volumes. Improvements anticipated at the B Street / Winton Parkway intersection presented in the LCHMC traffic study have been assumed to be installed are also shown. The trips associated with Tierrasanta Village were then superimposed onto the background volumes to create the Cumulative plus Project traffic volumes shown in Figure 9.

Improvements. In addition to the extension of Winton Parkway to F Street, the analysis of "Improved Conditions" assumes that these improvements are made at the interchange:

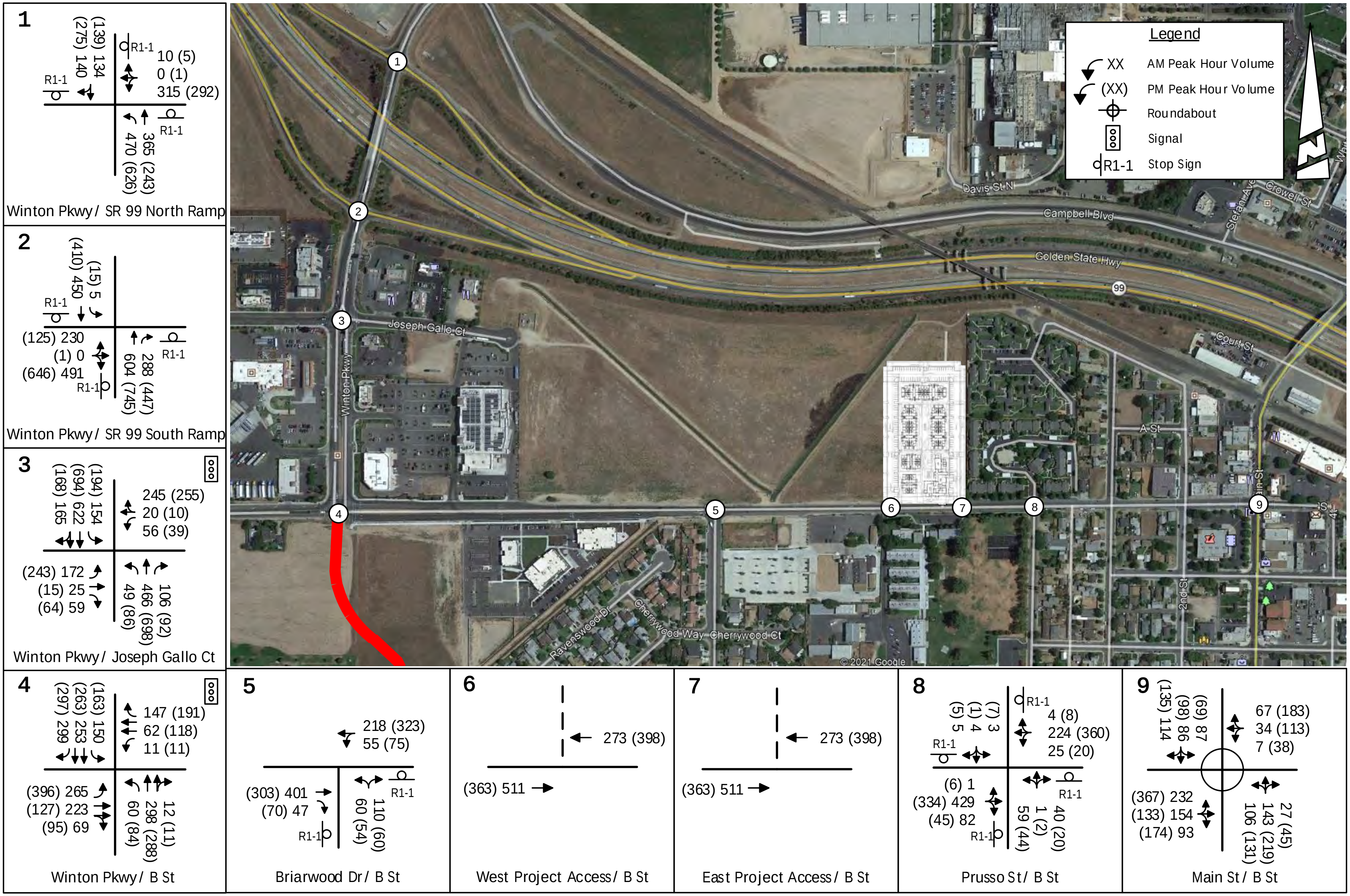
- SR 99 NB ramps: Signalize; add southbound right turn lane on Winton Parkway.
- SR 99 SB ramps: Signalize, add a separate right turn lane on the off-ramp.
- Restripe the butt-to-butt Winton Parkway left turn lanes on the SR 99 overcrossing to provide 150 foot SB left turn lane, 120 foot common bay taper and 250 foot NB left turn lane.
- Lengthen the EB left turn lane at the Winton Parkway / B Street intersection to 300 feet.
- Coordinate the traffic signals from the SR 99 NB ramps to B Street.

On B Street the improved conditions assume:

- separate left turn lanes on B Street at Prusso Street; and
- B Street is widened to develop a westbound left turn lane at Briarwood Drive.

The General Plan indicates that arterial streets, such as B Street are planned as four-lane roadways. However, development of four-lanes on B Street through the area of the project does not appear feasible until the balance of the street to the west is also widened.

The set of recommended improvements focusses on use of traffic signals, based on conclusion of previous traffic studies. However, Caltrans could determine that roundabout intersections are the preferred option on their facilities.



CUMULATIVE NO PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS
WITH WINTON PARKWAY EXTENSION

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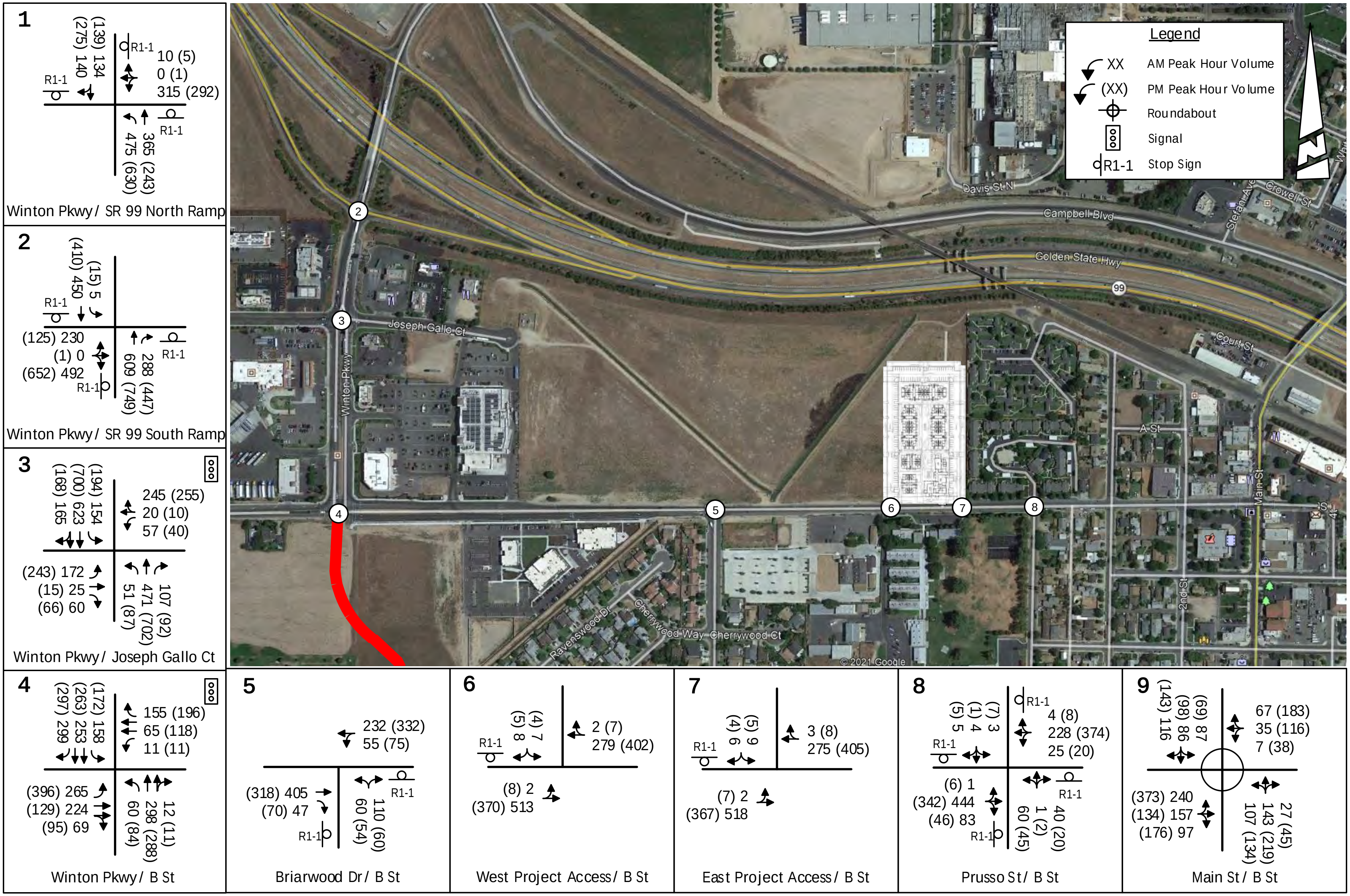
figure 8



CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS
WITH WINTON PARKWAY EXTENSION

KD Anderson & Associates, Inc.
Transportation Engineers

0780-19 RA 4/15/2021

figure 9

Intersection Levels of Service. Projected Levels of Service at study area intersections with the Tierrasanta Village Apartments are noted in Table 18. Because Caltrans control improvements to the state highway, the Levels of Service at the signalized Winton Parkway intersection were determined through simulation.

As indicated if the other approved /pending development projects proceed as assumed and the identified improvements are made, then with two exceptions, all study locations will satisfy the City's minimum LOS C standard and queuing would be adequate. The exceptions are the B Street / Briarwood Drive intersection which would operate at LOS D and the B Street / Prusso Street intersection which may still operate at LOS F during the a.m. peak hour. B Street would eventually need to be widened to four lanes as indicated in the Circulation Element to reach LOS C. Implementing the requirements of the General Plan would require that the Tierrasanta Village frontage be improved to the Circulation Element standard.

Intersection Queues. As indicated in Table 19, with one exception projected queues can be accommodated if background development occurs along with the Tierrasanta Village Apartments and the identified improvements are made. The southbound left turn lane queue on Winton Parkway approaching Joseph Gallo Drive may exceed the available storage slightly in the p.m. peak hour, and it will be necessary to monitor and adjust the signal timing along Winton Parkway as the area develops to address this possibility.

Peak Hour Traffic Signal Warrants. Table 20 summarizes the traffic volumes at unsignalized study intersections and indicates the status of peak hour signal warrants at the remaining unsignalized locations under cumulative plus project conditions. As shown the B Street / Briarwood Drive and B Street / Prusso Street intersections' volumes do not satisfy warrants.

TABLE 18
IMPROVED CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION LEVELS OF SERVICE WITH WINTON PARKWAY EXTENDED TO F STREET

Intersection	Control	AM Peak Hour Cumulative Plus Project		PM Peak Hour Cumulative Plus Project	
		Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
Winton Parkway / SR 99 NB ramps	Signal[1]	21.7	C	22.2	**C**
Winton Parkway / SR 99 SB ramps	Signal[1]	13.7	B	22.0	**C**
Winton Parkway / Joseph Gallo Drive	Signal[1]	19.2	B	24.1	**C**
Winton Parkway / B Street	Signal[1]	19.6	B	25.3	**C**
B Street / Briarwood Drive	AWS	**27.4**	**D**	13.5	B
B Street / Prusso Street	AWS	**113.2**	**F**	17.3	C
B Street / Main Street	Roundabout				
B Street / West Access	SB Stop	16.1	C	14.0	B
B Street / East Access	SB Stop	23.8	C	15.2	C

LOS = Level of Service.
AWS is all-way stop control. **Bold** Values Exceed LOS C. [1] LOS based on SimTraffic simulation

TABLE 19
IMPROVED CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION QUEUES
WITH WINTON PARKWAY EXTENDED TO F STREET

			AM Peak Hour Cumulative Plus Project		PM Peak Hour Cumulative Plus Project		
Intersection	**Lane**	**Storge (feet)**	**Volume (vph)**	**95th % Queue (feet)**	**Volume (vph)**	**95th % Queue (feet)**	**Queue > Storage?**
Winton Pkwy / SR 99 NB ramps	Off-ramp	1,240	325	415	298	345	No
	NB left	320	475	150	630	185	No
	Total Vol[1]		1,439		1,585		
Winton Pkwy / SR 99 SB ramps	Off-ramp	1,450	722	490	778	705	**No**
	SB left	80	5	<25	15	45	No
	Total Vol		2,074		2,399		
Winton Pkwy / Joseph Gallo Dr	NB left	240	51	90	87	160	Yes
	SB left	200	154	195	194	**240**	**Yes**
	Total vol		2,150		2,572		
Winton Pkwy / B Street	SB left	330	158	165	172	225	No
	EB left	300	265	**220**	396	295	No
	Total Vol		1,855		2,057		

LOS = Level of Service. AWS is all-way stop control. **Bold** Values Exceed available storage
[1] Total vol is total volume entering the intersection

TABLE 20
CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC SIGNAL WARRANTS
WITH WINTON PARKWAY EXTENDED TO F STREET

	AM Peak Hour Cumulative Plus Project		PM Peak Hour Cumulative Plus Project	
Intersection	**Major / Minor**	**Met**	**Major / Minor**	**Met?**
B Street / Briarwood Dr	739	**No**	795	No
	170		114	
	909		909	
B Street / Prusso Street	795	No	796	No
	101		67	
	908		876	

Project Fair Share Percentages

Calculation Methods The calculation of the project's fair share percentage at each intersection is based on its share of the future traffic at each location. Table 21 tabulates the components of total Cumulative Plus Project traffic forecasts at each location and identifies the existing p.m. peak hour traffic, as well as the traffic caused by the project and by other approved / pending projects.

Caltrans traffic study guidelines provide a framework for calculating the fair share, but as noted in Table 21 there is a consideration that could guide the results. Under the typical process, it is assumed that only the development causing new traffic at the location would contribute to the cost of improvements. That assumption suggests that existing traffic has no responsibility for the improvement because current operating conditions are acceptable and that the need for the improvement is solely the result of new growth. This assumption also suggests that no other source of funds for improvements will be available. Under this assumption the fair share is the projects traffic divided by the total future traffic less current volumes.

The alternative approach assumes that the existing traffic contributes to the need for long term improvements. In this case the share is project traffic divided by total future traffic. Application of this method requires the assumption that a source of funds other than the project and future development will be available. This could be the case were the City of Livingston to secure funds for improvements and it was necessary to allocate the share of the cost that may be the City's "responsibility". This approach is less applicable when no other source for funds has been identified, as is normally the case.

TABLE 21
FAIR SHARE CALCULATION

	A	B	C	D	Fair Share Percentage				
					A s Share of New Growth Only[2]		As a Share of All Cumulative Traffic[2]		
Location	**Existing**	**Tierrasanta Village Only**	**Other Growth**	**Cumulativ e Plus Project**	**Tierrasanta Village**	**Other Growth**	**Tierra Santa Village**	**Other Growth**	**Other Agency**
Based on PM Peak Hour Traffic									
Winton Pkwy / SR 99 NB ramps	1,291	4	290	1,585	1.4%	98.6%	0.3%	18.3%	81.4%
Winton Pkwy / SR 99 SB ramps	1,806	10	583	2,399	1.7%	98.3%	0.4%	24.3%	75.3%
Winton Pkwy / Joseph Gallo Dr	1,925	16	633	2,574	2.5%	97.5%	0.6%	24.6%	64.8%
Winton Pkwy / B Street	1,270	17	770	2,057	2.2%	97.8%	0.8%	37.4%	61.8%
B Street / Briarwood Dr	1,030	24	440	1,494	5.2%	94.8%	1.6%	29.5%	68.9%
B Street / Prusso Street	734	24	319	1,077	7.0%	93.0%	2.2%	20.4%	77.4%
B Street / Main Street	1,510	23	346	1,879	6.2%	93.8%	1.2%	18.4%	80.4%

B/ (D-A) is the fair share as a percentage of new future traffic only
B/D is fair share based on all cumulative traffic

APPENDICES

Prepared by National Data & Surveying Services

Briarwood Dr & B St

Peak Hour Turning Movement Count

ID: 21-090016-001
City: Livingston

Day: Wednesday
Date: 03/17/2021

PEAK HOURS		COUNT PERIODS
AM	07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:30 PM - 05:30 PM	4:00 PM - 06:00 PM

Briarwood Dr – SOUTHBOUND

	Right	Through	Left	U-Turn	Exiting
AM	0	0	0	0	0
NOON	0	0	0	0	0
PM	0	0	0	0	0
	0	0	0	0	

B St – EASTBOUND

	AM	NOON	PM	
Exiting	273	0	300	
U-Turn	0	0	0	0
Left	0	0	0	0
Through	138	0	216	0
Right	51	0	174	0

B St – WESTBOUND

		PM	NOON	AM
Right	0	0	0	0
Through	0	182	0	143
Left	0	60	0	52
U-Turn	0	0	0	0
Exiting		259	0	248

Briarwood Dr – NORTHBOUND

	Exiting	U-Turn	Left	Through	Right
		0	0	0	0
PM	234	0	118	0	43
NOON	0	0	0	0	0
AM	103	0	130	0	110

CONTROL

3-Way Stop (NB/EB/WB)

	AM	NOON	PM
TEV	624	0	793
PHF	0.66		0.94

Cars (AM)

Approach	U-Turn / Left	Through	Right
SB	0	0	0
EB	0	131	50
WB	0	137	52
NB	129	0	109

HT (AM)

Approach	U-Turn / Left	Through	Right
SB	0	0	0
EB	0	7	1
WB	0	6	0
NB	1	0	1

Cars (NOON)

Approach	U-Turn / Left	Through	Right
SB	0	0	0
EB	0	0	0
WB	0	0	0
NB	0	0	0

HT (NOON)

Approach	U-Turn / Left	Through	Right
SB	0	0	0
EB	0	0	0
WB	0	0	0
NB	0	0	0

Cars (PM)

Approach	U-Turn / Left	Through	Right
SB	0	0	0
EB	0	212	174
WB	0	179	60
NB	118	0	43

HT (PM)

Approach	U-Turn / Left	Through	Right
SB	0	0	0
EB	0	4	0
WB	0	3	0
NB	0	0	0

Pedestrians (Crosswalks)

Crosswalk	AM	NOON	PM
North	0	0	0
South	0	0	0
East	0	0	0
West	0	0	0
Diagonals	0	0	0

National Data & Surveying Services Intersection Turning Movement Count

Location: Briarwood Dr & B St
City: Livingston
Control: 3-Way Stop (NB/EB/WB)

Project ID: 21-090016-001
Date: 03/17/2021

Data - Total

NS/EW Streets:	Briarwood Dr				Briarwood Dr				B St				B St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	26	0	5	0	0	0	0	0	0	5	11	0	2	27	0	0	76
7:15 AM	20	0	5	0	0	0	0	0	0	16	4	0	4	30	0	0	79
7:30 AM	34	0	24	0	0	0	0	0	0	31	11	0	6	29	0	0	135
7:45 AM	30	0	66	0	0	0	0	0	0	51	12	0	22	54	0	0	235
8:00 AM	39	0	13	0	0	0	0	0	0	30	18	0	16	39	0	0	155
8:15 AM	27	0	7	0	0	0	0	0	0	26	10	0	8	21	0	0	99
8:30 AM	27	0	8	0	0	0	0	0	0	27	13	0	9	29	0	0	113
8:45 AM	24	0	9	0	0	0	0	0	0	33	17	0	2	28	0	0	113
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	227	0	137	0	0	0	0	0	0	219	96	0	69	257	0	0	1005
APPROACH %'s :	62.36%	0.00%	37.64%	0.00%					0.00%	69.52%	30.48%	0.00%	21.17%	78.83%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	130	0	110	0	0	0	0	0	0	138	51	0	52	143	0	0	624
PEAK HR FACTOR :	0.833	0.000	0.417	0.000	0.000	0.000	0.000	0.000	0.000	0.676	0.708	0.000	0.591	0.662	0.000	0.000	0.664
	0.625								0.750				0.641				

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	30	0	12	0	0	0	0	0	0	58	41	0	16	36	0	0	193
4:15 PM	24	0	3	0	0	0	0	0	0	36	42	0	11	42	0	0	158
4:30 PM	21	0	16	0	0	0	0	0	0	68	41	0	16	50	0	0	212
4:45 PM	33	0	12	0	0	0	0	0	0	49	39	0	14	54	0	0	201
5:00 PM	36	0	5	0	0	0	0	0	0	59	60	0	17	34	0	0	211
5:15 PM	28	0	10	0	0	0	0	0	0	40	34	0	13	44	0	0	169
5:30 PM	34	0	9	0	0	0	0	0	0	64	53	0	11	38	0	0	209
5:45 PM	22	0	8	0	0	0	0	0	0	50	53	0	13	40	0	0	186
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	228	0	75	0	0	0	0	0	0	424	363	0	111	338	0	0	1539
APPROACH %'s :	75.25%	0.00%	24.75%	0.00%					0.00%	53.88%	46.12%	0.00%	24.72%	75.28%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	118	0	43	0	0	0	0	0	0	216	174	0	60	182	0	0	793
PEAK HR FACTOR :	0.819	0.000	0.672	0.000	0.000	0.000	0.000	0.000	0.000	0.794	0.725	0.000	0.882	0.843	0.000	0.000	0.935
	0.894								0.819				0.890				

National Data & Surveying Services Intersection Turning Movement Count

Location: Briarwood Dr & B St
City: Livingston
Control: 3-Way Stop (NB/EB/WB)

Project ID: 21-090016-001
Date: 03/17/2021

Data - Cars

NS/EW Streets:	Briarwood Dr				Briarwood Dr				B St				B St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	26	0	5	0	0	0	0	0	0	4	11	0	2	24	0	0	72
7:15 AM	20	0	5	0	0	0	0	0	0	16	4	0	4	29	0	0	78
7:30 AM	33	0	24	0	0	0	0	0	0	28	11	0	6	27	0	0	129
7:45 AM	30	0	66	0	0	0	0	0	0	49	12	0	22	53	0	0	232
8:00 AM	39	0	12	0	0	0	0	0	0	30	17	0	16	38	0	0	152
8:15 AM	27	0	7	0	0	0	0	0	0	24	10	0	8	19	0	0	95
8:30 AM	27	0	8	0	0	0	0	0	0	26	13	0	9	29	0	0	112
8:45 AM	24	0	9	0	0	0	0	0	0	33	17	0	2	27	0	0	112
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	226	0	136	0	0	0	0	0	0	210	95	0	69	246	0	0	982
APPROACH %'s :	62.43%	0.00%	37.57%	0.00%					0.00%	68.85%	31.15%	0.00%	21.90%	78.10%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	129	0	109	0	0	0	0	0	0	131	50	0	52	137	0	0	608
PEAK HR FACTOR :	0.827	0.000	0.413	0.000	0.000	0.000	0.000	0.000	0.000	0.668	0.735	0.000	0.591	0.646	0.000	0.000	0.655
	0.620								0.742				0.630				

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	30	0	12	0	0	0	0	0	0	58	41	0	16	35	0	0	192
4:15 PM	24	0	3	0	0	0	0	0	0	36	42	0	11	42	0	0	158
4:30 PM	21	0	16	0	0	0	0	0	0	66	41	0	16	50	0	0	210
4:45 PM	33	0	12	0	0	0	0	0	0	49	39	0	14	53	0	0	200
5:00 PM	36	0	5	0	0	0	0	0	0	59	60	0	17	33	0	0	210
5:15 PM	28	0	10	0	0	0	0	0	0	38	34	0	13	43	0	0	166
5:30 PM	34	0	9	0	0	0	0	0	0	64	52	0	10	38	0	0	207
5:45 PM	22	0	8	0	0	0	0	0	0	50	53	0	13	40	0	0	186
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	228	0	75	0	0	0	0	0	0	420	362	0	110	334	0	0	1529
APPROACH %'s :	75.25%	0.00%	24.75%	0.00%					0.00%	53.71%	46.29%	0.00%	24.77%	75.23%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	118	0	43	0	0	0	0	0	0	212	174	0	60	179	0	0	786
PEAK HR FACTOR :	0.819	0.000	0.672	0.000	0.000	0.000	0.000	0.000	0.000	0.803	0.725	0.000	0.882	0.844	0.000	0.000	0.936
	0.894								0.811				0.892				

National Data & Surveying Services Intersection Turning Movement Count

Location: Briarwood Dr & B St
City: Livingston
Control: 3-Way Stop (NB/EB/WB)

Project ID: 21-090016-001
Date: 03/17/2021

Data - HT

NS/EW Streets:	Briarwood Dr				Briarwood Dr				B St				B St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	4
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
7:30 AM	1	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	6
7:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
8:00 AM	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	3
8:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	1	0	0	0	0	0	0	9	1	0	0	11	0	0	23
APPROACH %'s :	50.00%	0.00%	50.00%	0.00%					0.00%	90.00%	10.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	1	0	1	0	0	0	0	0	0	7	1	0	0	6	0	0	16
PEAK HR FACTOR :	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.583	0.250	0.000	0.000	0.750	0.000	0.000	0.667
	0.500								0.667				0.750				

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	4	1	0	1	4	0	0	10
APPROACH %'s :									0.00%	80.00%	20.00%	0.00%	20.00%	80.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	0	7
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.750	0.000	0.000	0.583
									0.500				0.750				

National Data & Surveying Services Intersection Turning Movement Count

Location: Briarwood Dr & B St
City: Livingston
Control: 3-Way Stop (NB/EB/WB)

Project ID: 21-090016-001
Date: 03/17/2021

Data - Bikes

NS/EW Streets:	Briarwood Dr				Briarwood Dr				B St				B St				
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%					
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	3
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%					0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
PEAK HR FACTOR :	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250
	0.250																

National Data & Surveying Services Intersection Turning Movement Count

Location: Briarwood Dr & B St
City: Livingston

Project ID: 21-090016-001
Date: 03/17/2021

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Briarwood Dr		Briarwood Dr		B St		B St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	04:30 PM - 05:30 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

Prepared by National Data & Surveying Services

Prusso St & B St

Peak Hour Turning Movement Count

ID: 21-090016-002
City: Livingston

Day: Wednesday
Date: 03/17/2021

PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:30 PM - 05:30 PM

COUNT PERIODS	
AM	7:00 AM - 09:00 AM
NOON	NONE
PM	4:00 PM - 06:00 PM

CONTROL: 4-Way Stop

	AM	NOON	PM
TEV	480	0	549
PHF	0.57		0.80

SOUTHBOUND (Prusso St)

	Right	Through	Left	U-Turn	Departing
AM	5	4	3	0	6
NOON	0	0	0	0	0
PM	5	1	7	0	16
	0	0	0	0	

WESTBOUND (B St)

	PM	NOON	AM	
Right	8	0	4	0
Through	194	0	155	0
Left	14	0	17	0
U-Turn	0	0	0	0
Departing	242	0	169	

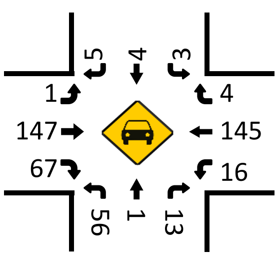
EASTBOUND (B St)

	AM	NOON	PM	
Departing	217	0	236	
U-Turn	0	0	0	0
Left	1	0	6	0
Through	153	0	223	0
Right	67	0	40	0

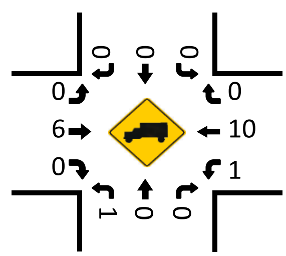
NORTHBOUND (Prusso St)

	Departing	U-Turn	Left	Through	Right
		0	0	0	0
PM	55	0	37	2	12
NOON	0	0	0	0	0
AM	88	0	57	1	13

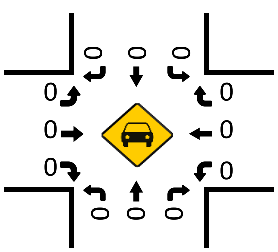
Cars (AM)



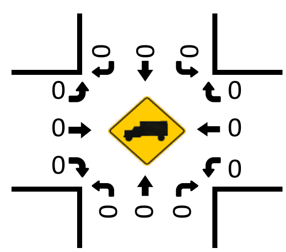
HT (AM)



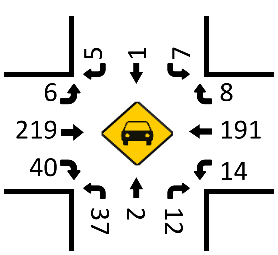
Cars (NOON)



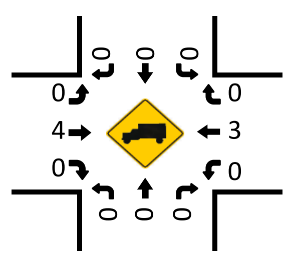
HT (NOON)



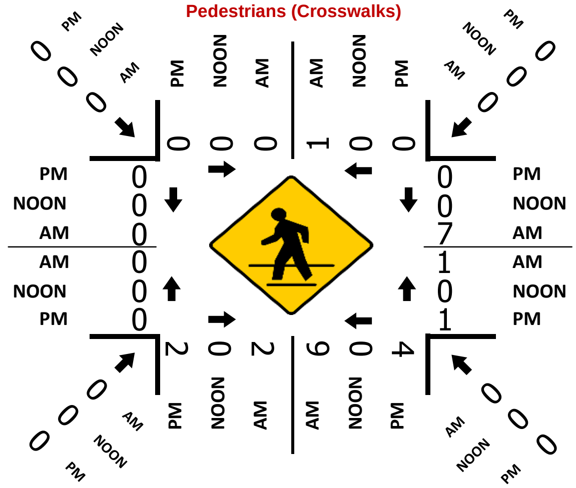
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)



National Data & Surveying Services **Intersection Turning Movement Count**

Location: Prusso St & B St
City: Livingston
Control: 4-Way Stop

Project ID: 21-090016-002
Date: 03/17/2021

Data - Total

NS/EW Streets:	Prusso St				Prusso St				B St				B St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	6	0	0	0	0	0	2	0	0	12	0	0	1	20	0	0	41
7:15 AM	10	1	0	0	0	0	1	0	0	15	1	0	4	27	0	0	59
7:30 AM	18	0	4	0	0	1	1	0	0	29	6	0	4	27	1	0	91
7:45 AM	19	1	5	0	2	1	2	0	1	61	37	0	7	73	0	0	209
8:00 AM	13	0	4	0	1	2	0	0	0	36	17	0	5	38	2	0	118
8:15 AM	7	0	0	0	0	0	2	0	0	27	7	0	1	17	1	0	62
8:30 AM	7	0	2	0	2	0	0	0	0	30	4	0	1	35	0	0	81
8:45 AM	5	0	4	0	0	0	2	0	0	34	5	0	2	20	1	0	73
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	85	2	19	0	5	4	10	0	1	244	77	0	25	257	5	0	734
APPROACH %'s :	80.19%	1.89%	17.92%	0.00%	26.32%	21.05%	52.63%	0.00%	0.31%	75.78%	23.91%	0.00%	8.71%	89.55%	1.74%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	57	1	13	0	3	4	5	0	1	153	67	0	17	155	4	0	480
PEAK HR FACTOR :	0.750	0.250	0.650	0.000	0.375	0.500	0.625	0.000	0.250	0.627	0.453	0.000	0.607	0.531	0.500	0.000	0.574
	0.710				0.600				0.558				0.550				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	11	0	3	0	2	0	0	0	2	49	16	0	4	39	0	0	126
4:15 PM	6	0	3	0	1	0	2	0	0	31	10	0	3	42	1	0	99
4:30 PM	10	1	5	0	2	0	1	0	2	75	15	0	5	52	3	0	171
4:45 PM	11	0	3	0	0	0	1	0	1	51	10	0	1	52	1	0	131
5:00 PM	8	1	2	0	4	1	1	0	3	50	9	0	5	43	1	0	128
5:15 PM	8	0	2	0	1	0	2	0	0	47	6	0	3	47	3	0	119
5:30 PM	7	1	2	0	1	0	2	0	2	57	13	0	2	38	1	0	126
5:45 PM	10	0	2	0	0	0	2	0	2	36	19	0	1	46	1	0	119
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	71	3	22	0	11	1	11	0	12	396	98	0	24	359	11	0	1019
APPROACH %'s :	73.96%	3.13%	22.92%	0.00%	47.83%	4.35%	47.83%	0.00%	2.37%	78.26%	19.37%	0.00%	6.09%	91.12%	2.79%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	37	2	12	0	7	1	5	0	6	223	40	0	14	194	8	0	549
PEAK HR FACTOR :	0.841	0.500	0.600	0.000	0.438	0.250	0.625	0.000	0.500	0.743	0.667	0.000	0.700	0.933	0.667	0.000	0.803
	0.797				0.542				0.731				0.900				

National Data & Surveying Services Intersection Turning Movement Count

Location: Prusso St & B St
City: Livingston
Control: 4-Way Stop

Project ID: 21-090016-002
Date: 03/17/2021

Data - Cars

NS/EW Streets:	Prusso St				Prusso St				B St				B St				
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	6	0	0	0	0	0	2	0	0	10	0	0	1	17	0	0	36
7:15 AM	10	1	0	0	0	0	1	0	0	14	1	0	4	27	0	0	58
7:30 AM	18	0	4	0	0	1	1	0	0	27	6	0	3	24	1	0	85
7:45 AM	19	1	5	0	2	1	2	0	1	59	37	0	7	68	0	0	202
8:00 AM	13	0	4	0	1	2	0	0	0	36	17	0	5	36	2	0	116
8:15 AM	6	0	0	0	0	0	2	0	0	25	7	0	1	17	1	0	59
8:30 AM	7	0	2	0	2	0	0	0	0	30	4	0	1	35	0	0	81
8:45 AM	5	0	4	0	0	0	2	0	0	33	5	0	2	19	1	0	71
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	84	2	19	0	5	4	10	0	1	234	77	0	24	243	5	0	708
APPROACH %'s :	80.00%	1.90%	18.10%	0.00%	26.32%	21.05%	52.63%	0.00%	0.32%	75.00%	24.68%	0.00%	8.82%	89.34%	1.84%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	56	1	13	0	3	4	5	0	1	147	67	0	16	145	4	0	462
PEAK HR FACTOR :	0.737	0.250	0.650	0.000	0.375	0.500	0.625	0.000	0.250	0.623	0.453	0.000	0.571	0.533	0.500	0.000	0.572
	0.700				0.600				0.554				0.550				

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	11	0	3	0	2	0	0	0	2	49	16	0	4	38	0	0	125
4:15 PM	6	0	3	0	1	0	2	0	0	31	10	0	3	42	1	0	99
4:30 PM	10	1	5	0	2	0	1	0	2	73	15	0	5	52	3	0	169
4:45 PM	11	0	3	0	0	0	1	0	1	51	10	0	1	51	1	0	130
5:00 PM	8	1	2	0	4	1	1	0	3	50	9	0	5	42	1	0	127
5:15 PM	8	0	2	0	1	0	2	0	0	45	6	0	3	46	3	0	116
5:30 PM	7	1	2	0	1	0	2	0	2	57	13	0	2	37	1	0	125
5:45 PM	10	0	2	0	0	0	2	0	2	36	19	0	1	46	1	0	119
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	71	3	22	0	11	1	11	0	12	392	98	0	24	354	11	0	1010
APPROACH %'s :	73.96%	3.13%	22.92%	0.00%	47.83%	4.35%	47.83%	0.00%	2.39%	78.09%	19.52%	0.00%	6.17%	91.00%	2.83%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	37	2	12	0	7	1	5	0	6	219	40	0	14	191	8	0	542
PEAK HR FACTOR :	0.841	0.500	0.600	0.000	0.438	0.250	0.625	0.000	0.500	0.750	0.667	0.000	0.700	0.918	0.667	0.000	0.802
	0.797				0.542				0.736				0.888				

National Data & Surveying Services Intersection Turning Movement Count

Location: Prusso St & B St
City: Livingston
Control: 4-Way Stop

Project ID: 21-090016-002
Date: 03/17/2021

Data - HT

NS/EW Streets: Prusso St (Northbound) | Prusso St (Southbound) | B St (Eastbound) | B St (Westbound)

AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	5
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	1	3	0	0	6
7:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	5	0	0	7
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
8:15 AM	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	0	0	0	10	0	0	1	14	0	0	26
APPROACH %'s :	100.00%	0.00%	0.00%	0.00%					0.00%	100.00%	0.00%	0.00%	6.67%	93.33%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	1	0	0	0	0	0	0	0	0	6	0	0	1	10	0	0	18
PEAK HR FACTOR :	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.250	0.500	0.000	0.000	0.643
	0.250								0.750				0.550				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0	0	9
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	0	7
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.750	0.000	0.000	0.583
									0.500				0.750				

National Data & Surveying Services Intersection Turning Movement Count

Location: Prusso St & B St
City: Livingston
Control: 4-Way Stop

Project ID: 21-090016-002
Date: 03/17/2021

Data - Bikes

NS/EW Streets:	Prusso St				Prusso St				B St				B St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%					
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0	0	4
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
5:00 PM	0	0	1	0	0	0	0	0	0	0	5	0	1	0	0	0	7
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	3	0	0	0	0	0	0	2	5	0	1	1	0	0	12
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%					0.00%	28.57%	71.43%	0.00%	50.00%	50.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	0	1	0	0	0	0	0	0	1	5	0	1	0	0	0	8
PEAK HR FACTOR :	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.250	0.000	0.250	0.000	0.000	0.000	0.286
	0.250								0.300				0.250				

National Data & Surveying Services Intersection Turning Movement Count

Location: Prusso St & B St
City: Livingston
Project ID: 21-090016-002
Date: 03/17/2021

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Prusso St		Prusso St		B St		B St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	1	8	1	6	0	0	16
8:00 AM	0	0	1	1	0	1	0	0	3
8:15 AM	0	1	0	0	0	0	0	0	1
8:30 AM	0	1	0	2	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	2	2	11	1	7	0	0	23
APPROACH %'s :	0.00%	100.00%	15.38%	84.62%	12.50%	87.50%			
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	1	2	9	1	7	0	0	20
PEAK HR FACTOR :		0.250	0.500	0.281	0.250	0.292			0.313
	0.250		0.306		0.286				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	1	0	1	0	0	2
4:15 PM	0	1	0	1	0	0	0	0	2
4:30 PM	0	0	0	0	1	0	0	0	1
4:45 PM	0	0	1	0	0	0	0	0	1
5:00 PM	0	0	1	0	0	0	0	0	1
5:15 PM	0	0	0	4	0	0	0	0	4
5:30 PM	0	1	2	0	1	0	0	0	4
5:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	2	4	6	2	1	0	0	15
APPROACH %'s :	0.00%	100.00%	40.00%	60.00%	66.67%	33.33%			
PEAK HR :	04:30 PM - 05:30 PM								TOTAL
PEAK HR VOL :	0	0	2	4	1	0	0	0	7
PEAK HR FACTOR :			0.500	0.250	0.250				0.438
			0.375		0.250				

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.2	0.1
Total Del/Veh (s)	9.8	11.2	9.4	10.5

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.6	0.7	0.0	0.5
Total Del/Veh (s)	39.2	20.0	27.3	28.8

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.4	0.9	0.0	0.1	0.5
Total Del/Veh (s)	24.2	12.5	12.5	15.2	14.9

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.3	0.0	0.1	0.5
Total Del/Veh (s)	14.0	6.4	8.5	9.9

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.3	0.1
Total Del/Veh (s)	19.9	11.4	18.7	17.6

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.0	0.1	0.1	0.3
Total Del/Veh (s)	16.7	8.1	5.4	4.7	12.8

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	512.2

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	134	161	118	150
Average Queue (ft)	65	73	62	65
95th Queue (ft)	107	121	97	115
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	865	105	413	327	30	311
Average Queue (ft)	264	95	180	79	2	116
95th Queue (ft)	759	123	360	217	17	266
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)			1	0		
Queuing Penalty (veh)			4	1		
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	7	37				9
Queuing Penalty (veh)	33	92				1

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	211	58	54	101	150	72	173	182	162	174	217
Average Queue (ft)	90	16	23	39	69	23	74	67	75	68	94
95th Queue (ft)	177	45	48	82	113	58	134	134	132	129	171
Link Distance (ft)		705			722		300	300		430	
Upstream Blk Time (%)								0			
Queuing Penalty (veh)								0			
Storage Bay Dist (ft)	315		150	300		250			210		210
Storage Blk Time (%)									0	0	0
Queuing Penalty (veh)									1	0	2

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	R	L	R
Maximum Queue (ft)	218	168	53	40	100	181	127
Average Queue (ft)	98	58	22	8	53	89	57
95th Queue (ft)	170	120	47	31	84	155	101
Link Distance (ft)		1899	436	436		229	229
Upstream Blk Time (%)						0	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)	180				250		
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	2	0					

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	418	180	158	290
Average Queue (ft)	126	46	57	83
95th Queue (ft)	326	132	111	233
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	236	117	77	39
Average Queue (ft)	103	48	36	9
95th Queue (ft)	229	85	61	33
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	12			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 147

Intersection	
Intersection Delay, s/veh	26.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	230	0	10	385	360	0	0	130	140
Future Vol, veh/h	0	0	0	230	0	10	385	360	0	0	130	140
Peak Hour Factor	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.92	0.92	0.76	0.76
Heavy Vehicles, %	2	2	2	2	67	8	9	5	2	2	4	8
Mvmt Flow	0	0	0	338	0	15	443	414	0	0	171	184
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	21.8	32.7	17.9
HCM LOS	C	D	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	96%	0%
Vol Thru, %	0%	100%	0%	48%
Vol Right, %	0%	0%	4%	52%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	385	360	240	270
LT Vol	385	0	230	0
Through Vol	0	360	0	130
RT Vol	0	0	10	140
Lane Flow Rate	443	414	353	355
Geometry Grp	7	7	2	5
Degree of Util (X)	0.862	0.739	0.657	0.599
Departure Headway (Hd)	7.01	6.431	6.705	6.07
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	513	559	540	593
Service Time	4.778	4.199	4.754	4.131
HCM Lane V/C Ratio	0.864	0.741	0.654	0.599
HCM Control Delay	39.6	25.4	21.8	17.9
HCM Lane LOS	E	D	C	C
HCM 95th-tile Q	9.2	6.3	4.8	4

Intersection	
Intersection Delay, s/veh	89.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	230	2	420	0	0	0	0	515	220	5	360	0
Future Vol, veh/h	230	2	420	0	0	0	0	515	220	5	360	0
Peak Hour Factor	0.82	0.82	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.73	0.73	0.92
Heavy Vehicles, %	6	14	11	2	2	2	2	9	14	17	5	2
Mvmt Flow	280	2	512	0	0	0	0	560	239	7	493	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	58.2	107.5	109.5
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	515	220	232	420	5	360
LT Vol	0	0	230	0	5	0
Through Vol	515	0	2	0	0	360
RT Vol	0	220	0	420	0	0
Lane Flow Rate	560	239	283	512	7	493
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.226	0.483	0.652	1.025	0.017	1.124
Departure Headway (Hd)	8.21	7.57	8.753	7.654	9.359	8.627
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	448	478	416	476	385	424
Service Time	5.91	5.27	6.453	5.354	7.059	6.327
HCM Lane V/C Ratio	1.25	0.5	0.68	1.076	0.018	1.163
HCM Control Delay	146.1	17.1	26.4	75.7	12.2	110.9
HCM Lane LOS	F	C	D	F	B	F
HCM 95th-tile Q	21.7	2.6	4.5	14.2	0.1	16.9

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	143	27	55	54	280	40	517	163	745
v/c Ratio	0.76	0.05	0.10	0.36	0.55	0.26	0.60	0.69	0.55
Control Delay	58.9	20.5	0.3	42.6	8.8	39.3	24.1	48.9	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.9	20.5	0.3	42.6	8.8	39.3	24.1	48.9	18.7
Queue Length 50th (ft)	47	8	0	18	7	13	76	53	79
Queue Length 95th (ft)	#239	29	0	#92	64	59	181	#238	264
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	189	588	622	148	615	155	1600	237	1723
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	0.76	0.05	0.09	0.36	0.46	0.26	0.32	0.69	0.43

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)	130	25	50	50	20	240	35	355	95	140	520	120
Future Volume (veh/h)	130	25	50	50	20	240	35	355	95	140	520	120
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	1530	1781	1856	1663	1870	1870	1767	1856	1767	1722	1796	1737
Adj Flow Rate, veh/h	143	27	55	54	22	258	40	408	109	163	605	140
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.87	0.87	0.87	0.86	0.86	0.86
Percent Heavy Veh, %	25	8	3	16	2	2	9	3	9	12	7	11
Cap, veh/h	172	475	419	96	26	309	83	632	167	202	834	193
Arrive On Green	0.12	0.27	0.27	0.06	0.21	0.21	0.05	0.23	0.23	0.12	0.30	0.30
Sat Flow, veh/h	1457	1781	1572	1584	126	1478	1682	2758	729	1640	2753	636
Grp Volume(v), veh/h	143	27	55	54	0	280	40	259	258	163	375	370
Grp Sat Flow(s),veh/h/ln	1457	1781	1572	1584	0	1604	1682	1763	1724	1640	1706	1682
Q Serve(g_s), s	5.5	0.6	1.5	1.9	0.0	9.6	1.3	7.6	7.8	5.5	11.2	11.3
Cycle Q Clear(g_c), s	5.5	0.6	1.5	1.9	0.0	9.6	1.3	7.6	7.8	5.5	11.2	11.3
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.42	1.00		0.38
Lane Grp Cap(c), veh/h	172	475	419	96	0	335	83	404	395	202	517	510
V/C Ratio(X)	0.83	0.06	0.13	0.56	0.00	0.84	0.48	0.64	0.65	0.81	0.72	0.73
Avail Cap(c_a), veh/h	213	475	419	169	0	392	176	922	902	269	893	880
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	15.7	16.0	26.2	0.0	21.7	26.5	20.0	20.0	24.5	17.8	17.9
Incr Delay (d2), s/veh	19.8	0.0	0.1	5.1	0.0	12.9	4.3	1.7	1.8	12.5	1.9	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.2	0.5	0.8	0.0	4.5	0.6	2.9	2.9	2.6	4.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.6	15.7	16.1	31.3	0.0	34.6	30.8	21.7	21.8	37.0	19.8	19.9
LnGrp LOS	D	B	B	C	A	C	C	C	C	D	B	B
Approach Vol, veh/h		225			334			557			908	
Approach Delay, s/veh		34.2			34.1			22.4			22.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	17.7	8.1	19.9	7.4	22.0	11.4	16.6
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	9.4	30.0	6.1	11.7	6.0	30.0	8.4	14.0
Max Q Clear Time (g_c+I1), s	7.5	9.8	3.9	3.5	3.3	13.3	7.5	11.6
Green Ext Time (p_c), s	0.1	2.8	0.0	0.1	0.0	4.1	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	314	273	68	377	327	395
v/c Ratio	0.71	0.27	0.10	0.61	0.64	0.54
Control Delay	36.3	9.1	19.9	7.3	26.3	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	9.1	19.9	7.3	26.3	5.5
Queue Length 50th (ft)	75	38	9	0	81	0
Queue Length 95th (ft)	#415	126	26	34	236	37
Internal Link Dist (ft)		1856	434		221	
Turn Bay Length (ft)	180			250		
Base Capacity (vph)	510	1481	1506	890	703	866
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	0.62	0.18	0.05	0.42	0.47	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	270	235	55	305	265	320
Future Volume (veh/h)	270	235	55	305	265	320
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	314	273	68	284	327	302
Peak Hour Factor	0.86	0.86	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	386	1027	826	368	448	399
Arrive On Green	0.22	0.55	0.23	0.23	0.25	0.25
Sat Flow, veh/h	1781	1870	3647	1585	1781	1585
Grp Volume(v), veh/h	314	273	68	284	327	302
Grp Sat Flow(s),veh/h/ln	1781	1870	1777	1585	1781	1585
Q Serve(g_s), s	7.7	3.6	0.7	7.7	7.8	8.1
Cycle Q Clear(g_c), s	7.7	3.6	0.7	7.7	7.8	8.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	386	1027	826	368	448	399
V/C Ratio(X)	0.81	0.27	0.08	0.77	0.73	0.76
Avail Cap(c_a), veh/h	579	1027	1541	687	734	653
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	17.2	5.5	13.9	16.6	15.8	16.0
Incr Delay (d2), s/veh	5.4	0.1	0.0	3.4	2.3	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.9	0.2	2.7	2.8	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.5	5.6	13.9	20.0	18.1	18.9
LnGrp LOS	C	A	B	B	B	B
Approach Vol, veh/h		587	352		629	
Approach Delay, s/veh		14.7	18.8		18.5	
Approach LOS		B	B		B	

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				29.9		16.2	14.6	15.3
Change Period (Y+Rc), s				4.6		4.6	4.6	4.6
Max Green Setting (Gmax), s				15.0		19.0	15.0	20.0
Max Q Clear Time (g_c+I1), s				5.6		10.1	9.7	9.7
Green Ext Time (p_c), s				1.0		1.5	0.5	1.0

Intersection Summary	
HCM 6th Ctrl Delay	17.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	58.1
Intersection LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	420	155	55	210	190	110
Future Vol, veh/h	420	155	55	210	190	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	560	207	86	328	306	177
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	80.9	32.4	43.9
HCM LOS	F	D	E

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	63%	0%	0%	21%
Vol Thru, %	0%	100%	0%	79%
Vol Right, %	37%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	300	420	155	265
LT Vol	190	0	0	55
Through Vol	0	420	0	210
RT Vol	110	0	155	0
Lane Flow Rate	484	560	207	414
Geometry Grp	2	7	7	5
Degree of Util (X)	0.894	1.128	0.369	0.793
Departure Headway (Hd)	6.911	7.252	6.433	7.175
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	527	504	554	509
Service Time	4.911	4.952	4.232	5.175
HCM Lane V/C Ratio	0.918	1.111	0.374	0.813
HCM Control Delay	43.9	105.9	13	32.4
HCM Lane LOS	E	F	B	D
HCM 95th-tile Q	10.2	19	1.7	7.3

Intersection	
Intersection Delay, s/veh	106.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	435	95	25	215	4	60	1	40	3	4	5
Future Vol, veh/h	1	435	95	25	215	4	60	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	777	170	45	391	7	85	1	56	5	7	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	163	19.4	12.6	10.9
HCM LOS	F	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	59%	0%	10%	25%
Vol Thru, %	1%	82%	88%	33%
Vol Right, %	40%	18%	2%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	531	244	12
LT Vol	60	1	25	3
Through Vol	1	435	215	4
RT Vol	40	95	4	5
Lane Flow Rate	142	948	444	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.258	1.302	0.662	0.039
Departure Headway (Hd)	7.165	4.945	5.786	7.631
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	505	730	630	472
Service Time	5.165	3.045	3.786	5.631
HCM Lane V/C Ratio	0.281	1.299	0.705	0.042
HCM Control Delay	12.6	163	19.4	10.9
HCM Lane LOS	B	F	C	B
HCM 95th-tile Q	1	36.5	4.9	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.2
Total Del/Veh (s)	8.1	16.1	17.6	15.6

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.5	0.0	0.0	0.2
Total Del/Veh (s)	19.1	13.5	11.1	15.0

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.6	0.6	0.0	0.1	0.6
Total Del/Veh (s)	38.8	12.4	17.2	17.5	19.4

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.7	0.0	0.0	0.5
Total Del/Veh (s)	18.0	6.5	9.8	11.2

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	7.4	8.2	6.5	7.5

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.1	0.1	0.1
Total Del/Veh (s)	7.3	8.6	5.1	4.4	7.6

Total Zone Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	382.4

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	99	247	254	299
Average Queue (ft)	49	111	62	112
95th Queue (ft)	80	214	165	243
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		8		
Queuing Penalty (veh)		20		

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	435	105	308	149	52	123
Average Queue (ft)	128	93	148	67	12	60
95th Queue (ft)	351	119	253	112	39	99
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	1	27				
Queuing Penalty (veh)	5	34				

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	302	89	60	75	173	112	178	177	199	162	164
Average Queue (ft)	132	14	24	23	74	46	90	76	101	79	74
95th Queue (ft)	254	93	49	58	129	93	154	142	173	137	133
Link Distance (ft)		705			722		300	300		430	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	315		150	300		250			210		210
Storage Blk Time (%)	1								0	0	0
Queuing Penalty (veh)	1								1	0	0

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	R	L	R
Maximum Queue (ft)	236	175	60	50	102	213	68
Average Queue (ft)	118	29	27	11	56	108	36
95th Queue (ft)	205	112	52	38	86	190	61
Link Distance (ft)		1899	436	436		229	229
Upstream Blk Time (%)						0	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)	180				250		
Storage Blk Time (%)	3						
Queuing Penalty (veh)	2						

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	131	91	135	97
Average Queue (ft)	60	49	58	45
95th Queue (ft)	97	78	99	77
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	101	92	70	31
Average Queue (ft)	58	51	30	9
95th Queue (ft)	88	80	52	32
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 63

Intersection	
Intersection Delay, s/veh	28
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣		↰	↑			↱	
Traffic Vol, veh/h	0	0	0	155	1	5	490	235	0	0	130	275
Future Vol, veh/h	0	0	0	155	1	5	490	235	0	0	130	275
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.95	0.95	0.95	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	8	5	6	2	2	12	2
Mvmt Flow	0	0	0	194	1	6	516	247	0	0	157	331
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	14.2	35.1	22.5
HCM LOS	B	E	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	96%	0%
Vol Thru, %	0%	100%	1%	32%
Vol Right, %	0%	0%	3%	68%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	490	235	161	405
LT Vol	490	0	155	0
Through Vol	0	235	1	130
RT Vol	0	0	5	275
Lane Flow Rate	516	247	201	488
Geometry Grp	7	7	2	5
Degree of Util (X)	0.92	0.407	0.385	0.74
Departure Headway (Hd)	6.418	5.928	6.879	5.461
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	562	606	523	664
Service Time	4.163	3.673	4.932	3.504
HCM Lane V/C Ratio	0.918	0.408	0.384	0.735
HCM Control Delay	45.9	12.7	14.2	22.5
HCM Lane LOS	E	B	B	C
HCM 95th-tile Q	11.4	2	1.8	6.5

Intersection	
Intersection Delay, s/veh	85.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	1	500	0	0	0	0	600	300	15	265	0
Future Vol, veh/h	125	1	500	0	0	0	0	600	300	15	265	0
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.95	0.95	0.95	0.77	0.77	0.77
Heavy Vehicles, %	6	2	7	2	2	2	2	4	15	8	8	2
Mvmt Flow	129	1	515	0	0	0	0	632	316	19	344	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	52.6	128.5	32.8
HCM LOS	F	F	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	600	300	126	500	15	265
LT Vol	0	0	125	0	15	0
Through Vol	600	0	1	0	0	265
RT Vol	0	300	0	500	0	0
Lane Flow Rate	632	316	130	515	19	344
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.324	0.615	0.293	0.98	0.046	0.766
Departure Headway (Hd)	7.545	7.016	8.539	7.24	8.993	8.474
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	480	512	423	505	401	430
Service Time	5.325	4.795	6.239	4.94	6.693	6.174
HCM Lane V/C Ratio	1.317	0.617	0.307	1.02	0.047	0.8
HCM Control Delay	182.5	20.5	14.7	62.1	12.1	34
HCM Lane LOS	F	C	B	F	B	D
HCM 95th-tile Q	27.6	4.1	1.2	12.9	0.1	6.5

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	218	18	59	27	266	86	644	189	592
v/c Ratio	1.10	0.03	0.10	0.19	0.54	0.54	0.68	0.81	0.49
Control Delay	126.3	19.8	0.3	39.0	8.3	49.1	26.5	60.3	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	126.3	19.8	0.3	39.0	8.3	49.1	26.5	60.3	19.6
Queue Length 50th (ft)	~83	4	0	9	4	31	105	68	84
Queue Length 95th (ft)	#339	21	0	46	58	#142	237	#301	213
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	199	637	622	144	598	160	1599	232	1690
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	1.10	0.03	0.09	0.19	0.44	0.54	0.40	0.81	0.35

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	15	50	25	10	240	75	480	80	185	470	110
Future Volume (veh/h)	185	15	50	25	10	240	75	480	80	185	470	110
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	1663	1870	1826	1663	1870	1856	1856	1870	1870	1737	1781	1856
Adj Flow Rate, veh/h	218	18	59	27	11	255	86	552	92	189	480	112
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	16	2	5	16	2	3	3	2	2	11	8	3
Cap, veh/h	206	543	449	57	13	299	129	764	127	228	860	199
Arrive On Green	0.13	0.29	0.29	0.04	0.20	0.20	0.07	0.25	0.25	0.14	0.32	0.32
Sat Flow, veh/h	1584	1870	1547	1584	66	1529	1767	3049	507	1654	2727	633
Grp Volume(v), veh/h	218	18	59	27	0	266	86	321	323	189	297	295
Grp Sat Flow(s),veh/h/ln	1584	1870	1547	1584	0	1595	1767	1777	1779	1654	1692	1668
Q Serve(g_s), s	8.4	0.4	1.8	1.1	0.0	10.4	3.1	10.6	10.7	7.2	9.4	9.5
Cycle Q Clear(g_c), s	8.4	0.4	1.8	1.1	0.0	10.4	3.1	10.6	10.7	7.2	9.4	9.5
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.28	1.00		0.38
Lane Grp Cap(c), veh/h	206	543	449	57	0	312	129	445	446	228	533	526
V/C Ratio(X)	1.06	0.03	0.13	0.48	0.00	0.85	0.67	0.72	0.72	0.83	0.56	0.56
Avail Cap(c_a), veh/h	206	543	449	150	0	347	165	827	828	241	788	776
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	16.4	16.9	30.5	0.0	25.0	29.1	22.1	22.1	27.1	18.3	18.4
Incr Delay (d2), s/veh	78.2	0.0	0.1	6.1	0.0	16.8	6.7	2.2	2.3	20.2	0.9	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	7.5	0.2	0.6	0.5	0.0	5.1	1.4	4.2	4.2	3.9	3.3	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.2	16.4	17.0	36.6	0.0	41.8	35.8	24.3	24.4	47.2	19.2	19.3
LnGrp LOS	F	B	B	D	A	D	D	C	C	D	B	B
Approach Vol, veh/h		295			293			730			781	
Approach Delay, s/veh		82.9			41.4			25.7			26.0	
Approach LOS		F			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	20.8	6.9	23.3	9.3	24.9	13.0	17.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	9.4	30.0	6.1	11.7	6.0	30.0	8.4	14.0
Max Q Clear Time (g_c+I1), s	9.2	12.7	3.1	3.8	5.1	11.5	10.4	12.4
Green Ext Time (p_c), s	0.0	3.4	0.0	0.1	0.0	3.2	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	36.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	362	92	82	352	316	179
v/c Ratio	0.76	0.09	0.12	0.59	0.65	0.32
Control Delay	37.4	7.8	19.9	7.2	27.0	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	7.8	19.9	7.2	27.0	5.5
Queue Length 50th (ft)	89	11	11	0	78	0
Queue Length 95th (ft)	#498	48	33	56	261	47
Internal Link Dist (ft)		1856	434		221	
Turn Bay Length (ft)	180			250		
Base Capacity (vph)	496	1457	1470	863	685	722
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	0.73	0.06	0.06	0.41	0.46	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	315	80	75	320	300	170
Future Volume (veh/h)	315	80	75	320	300	170
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	362	92	82	270	316	100
Peak Hour Factor	0.87	0.87	0.91	0.91	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	435	1066	799	356	408	363
Arrive On Green	0.24	0.57	0.22	0.22	0.23	0.23
Sat Flow, veh/h	1781	1870	3647	1585	1781	1585
Grp Volume(v), veh/h	362	92	82	270	316	100
Grp Sat Flow(s),veh/h/ln	1781	1870	1777	1585	1781	1585
Q Serve(g_s), s	8.8	1.0	0.8	7.3	7.6	2.4
Cycle Q Clear(g_c), s	8.8	1.0	0.8	7.3	7.6	2.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	435	1066	799	356	408	363
V/C Ratio(X)	0.83	0.09	0.10	0.76	0.78	0.28
Avail Cap(c_a), veh/h	585	1066	1556	694	741	659
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.4	4.4	14.1	16.5	16.5	14.5
Incr Delay (d2), s/veh	7.5	0.0	0.1	3.3	3.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.2	0.3	2.5	2.8	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.9	4.5	14.1	19.9	19.7	14.9
LnGrp LOS	C	A	B	B	B	B
Approach Vol, veh/h		454	352		416	
Approach Delay, s/veh		20.0	18.5		18.5	
Approach LOS		B	B		B	

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				30.6		15.1	15.8	14.9
Change Period (Y+Rc), s				4.6		4.6	4.6	4.6
Max Green Setting (Gmax), s				15.0		19.0	15.0	20.0
Max Q Clear Time (g_c+I1), s				3.0		9.6	10.8	9.3
Green Ext Time (p_c), s				0.3		0.9	0.5	1.0

Intersection Summary			
HCM 6th Ctrl Delay			19.1
HCM 6th LOS			B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	14
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	255	220	75	255	165	60
Future Vol, veh/h	255	220	75	255	165	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	311	268	84	287	185	67
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.8	16	13.6
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	73%	0%	0%	23%
Vol Thru, %	0%	100%	0%	77%
Vol Right, %	27%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	225	255	220	330
LT Vol	165	0	0	75
Through Vol	0	255	0	255
RT Vol	60	0	220	0
Lane Flow Rate	253	311	268	371
Geometry Grp	2	7	7	5
Degree of Util (X)	0.426	0.504	0.382	0.576
Departure Headway (Hd)	6.073	5.832	5.122	5.592
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	592	619	703	645
Service Time	4.117	3.568	2.858	3.629
HCM Lane V/C Ratio	0.427	0.502	0.381	0.575
HCM Control Delay	13.6	14.4	11	16
HCM Lane LOS	B	B	B	C
HCM 95th-tile Q	2.1	2.8	1.8	3.7

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	6	290	40	20	295	8	40	2	20	7	1	5
Future Vol, veh/h	6	290	40	20	295	8	40	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	397	55	22	328	9	50	3	25	13	2	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.8	11.9	9.6	9.1
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	65%	2%	6%	54%
Vol Thru, %	3%	86%	91%	8%
Vol Right, %	32%	12%	2%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	336	323	13
LT Vol	40	6	20	7
Through Vol	2	290	295	1
RT Vol	20	40	8	5
Lane Flow Rate	78	460	359	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.123	0.582	0.47	0.039
Departure Headway (Hd)	5.706	4.554	4.716	5.873
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	622	787	761	613
Service Time	3.803	2.607	2.774	3.873
HCM Lane V/C Ratio	0.125	0.584	0.472	0.039
HCM Control Delay	9.6	13.8	11.9	9.1
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.4	3.8	2.5	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.1
Total Del/Veh (s)	10.5	11.4	9.5	10.8

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.6	1.1	0.1	0.7
Total Del/Veh (s)	46.3	23.0	25.5	32.2

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.4	1.0	0.0	0.1	0.6
Total Del/Veh (s)	35.2	14.2	14.2	16.0	17.3

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.3	0.0	0.0	0.4
Total Del/Veh (s)	15.0	6.3	8.3	10.1

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	17.8	11.1	20.2	16.8

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	3.4	0.2	9.6	2.4

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	9.5	0.0	0.1	6.4
Total Del/Veh (s)	8.8	2.6	27.4	7.1

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.6	0.0	0.1	0.1	1.0
Total Del/Veh (s)	17.6	8.1	5.7	4.5	13.3

Total Zone Performance

Denied Del/Veh (s)	3.5
Total Del/Veh (s)	402.3

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	160	141	124	153
Average Queue (ft)	66	72	60	66
95th Queue (ft)	121	115	97	113
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		0	0	
Queuing Penalty (veh)		1	0	

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	1048	105	417	307	110	328
Average Queue (ft)	311	95	199	87	6	114
95th Queue (ft)	916	121	387	249	56	261
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)			2	1		
Queuing Penalty (veh)			9	3		
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	7	37				8
Queuing Penalty (veh)	33	90				0

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	280	221	56	102	152	89	177	175	180	181	199
Average Queue (ft)	106	39	21	42	75	27	80	70	82	76	92
95th Queue (ft)	233	192	46	84	130	64	147	134	149	140	161
Link Distance (ft)		705			722		300	300		430	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	315		150	300		250			210		210
Storage Blk Time (%)	4						0		0	0	0
Queuing Penalty (veh)	3						0		0	0	1

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	R	L	R
Maximum Queue (ft)	220	161	50	34	97	193	146
Average Queue (ft)	106	56	23	7	54	95	57
95th Queue (ft)	182	120	48	28	82	166	105
Link Distance (ft)		1899	436	436		229	229
Upstream Blk Time (%)						0	0
Queuing Penalty (veh)						0	0
Storage Bay Dist (ft)	180				250		
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	3	0					

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	360	133	147	317
Average Queue (ft)	118	42	59	87
95th Queue (ft)	269	92	113	261
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	18	33
Average Queue (ft)	1	14
95th Queue (ft)	8	37
Link Distance (ft)	708	597
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	253	49
Average Queue (ft)	52	13
95th Queue (ft)	205	40
Link Distance (ft)	304	584
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	236	109	74	34
Average Queue (ft)	111	47	39	10
95th Queue (ft)	242	82	63	34
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	13			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 157

Intersection	
Intersection Delay, s/veh	27.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	230	0	10	390	360	0	0	130	140
Future Vol, veh/h	0	0	0	230	0	10	390	360	0	0	130	140
Peak Hour Factor	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.92	0.92	0.76	0.76
Heavy Vehicles, %	2	2	2	2	67	8	9	5	2	2	4	8
Mvmt Flow	0	0	0	338	0	15	448	414	0	0	171	184
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	21.8	33.7	17.9
HCM LOS	C	D	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	96%	0%
Vol Thru, %	0%	100%	0%	48%
Vol Right, %	0%	0%	4%	52%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	390	360	240	270
LT Vol	390	0	230	0
Through Vol	0	360	0	130
RT Vol	0	0	10	140
Lane Flow Rate	448	414	353	355
Geometry Grp	7	7	2	5
Degree of Util (X)	0.873	0.74	0.658	0.6
Departure Headway (Hd)	7.013	6.434	6.711	6.076
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	516	559	536	593
Service Time	4.782	4.202	4.76	4.137
HCM Lane V/C Ratio	0.868	0.741	0.659	0.599
HCM Control Delay	41.2	25.5	21.8	17.9
HCM Lane LOS	E	D	C	C
HCM 95th-tile Q	9.5	6.3	4.8	4

Intersection	
Intersection Delay, s/veh	90.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	230	2	421	0	0	0	0	520	220	5	360	0
Future Vol, veh/h	230	2	421	0	0	0	0	520	220	5	360	0
Peak Hour Factor	0.82	0.82	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.73	0.73	0.92
Heavy Vehicles, %	6	14	11	2	2	2	2	9	14	17	5	2
Mvmt Flow	280	2	513	0	0	0	0	565	239	7	493	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	58.9	111	109.6
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	520	220	232	421	5	360
LT Vol	0	0	230	0	5	0
Through Vol	520	0	2	0	0	360
RT Vol	0	220	0	421	0	0
Lane Flow Rate	565	239	283	513	7	493
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.238	0.483	0.652	1.029	0.017	1.124
Departure Headway (Hd)	8.214	7.575	8.761	7.663	9.375	8.643
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	447	478	416	477	384	424
Service Time	5.914	5.275	6.461	5.363	7.075	6.343
HCM Lane V/C Ratio	1.264	0.5	0.68	1.075	0.018	1.163
HCM Control Delay	150.7	17.1	26.4	76.8	12.2	111
HCM Lane LOS	F	C	D	F	B	F
HCM 95th-tile Q	22.2	2.6	4.5	14.3	0.1	16.9

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	143	27	56	55	280	43	524	163	746
v/c Ratio	0.76	0.05	0.10	0.37	0.55	0.28	0.61	0.69	0.55
Control Delay	59.0	20.5	0.3	42.8	8.8	39.7	24.2	48.9	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.0	20.5	0.3	42.8	8.8	39.7	24.2	48.9	18.7
Queue Length 50th (ft)	48	8	0	18	7	14	77	53	79
Queue Length 95th (ft)	#239	29	0	#93	64	62	184	#238	264
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	189	588	622	148	615	155	1601	237	1723
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	0.76	0.05	0.09	0.37	0.46	0.28	0.33	0.69	0.43

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)	130	25	51	51	20	240	37	360	96	140	521	120
Future Volume (veh/h)	130	25	51	51	20	240	37	360	96	140	521	120
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	1530	1781	1856	1663	1870	1870	1767	1856	1767	1722	1796	1737
Adj Flow Rate, veh/h	143	27	56	55	22	258	43	414	110	163	606	140
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.87	0.87	0.87	0.86	0.86	0.86
Percent Heavy Veh, %	25	8	3	16	2	2	9	3	9	12	7	11
Cap, veh/h	172	473	417	97	26	308	87	639	168	202	833	192
Arrive On Green	0.12	0.27	0.27	0.06	0.21	0.21	0.05	0.23	0.23	0.12	0.30	0.30
Sat Flow, veh/h	1457	1781	1572	1584	126	1478	1682	2761	727	1640	2754	635
Grp Volume(v), veh/h	143	27	56	55	0	280	43	263	261	163	375	371
Grp Sat Flow(s),veh/h/ln	1457	1781	1572	1584	0	1604	1682	1763	1725	1640	1706	1682
Q Serve(g_s), s	5.5	0.7	1.6	1.9	0.0	9.7	1.4	7.8	7.9	5.6	11.3	11.4
Cycle Q Clear(g_c), s	5.5	0.7	1.6	1.9	0.0	9.7	1.4	7.8	7.9	5.6	11.3	11.4
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.42	1.00		0.38
Lane Grp Cap(c), veh/h	172	473	417	97	0	334	87	408	399	202	517	509
V/C Ratio(X)	0.83	0.06	0.13	0.57	0.00	0.84	0.49	0.64	0.65	0.81	0.73	0.73
Avail Cap(c_a), veh/h	212	473	417	168	0	389	175	917	897	267	888	875
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	15.8	16.1	26.3	0.0	21.9	26.6	20.0	20.1	24.6	18.0	18.0
Incr Delay (d2), s/veh	20.1	0.0	0.1	5.2	0.0	13.1	4.3	1.7	1.8	12.7	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.2	0.5	0.8	0.0	4.5	0.6	3.0	3.0	2.6	4.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.9	15.8	16.3	31.5	0.0	35.0	30.9	21.7	21.9	37.3	19.9	20.0
LnGrp LOS	D	B	B	C	A	D	C	C	C	D	B	C
Approach Vol, veh/h		226			335			567			909	
Approach Delay, s/veh		34.4			34.4			22.5			23.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.7	18.0	8.1	19.9	7.6	22.1	11.4	16.6
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	9.4	30.0	6.1	11.7	6.0	30.0	8.4	14.0
Max Q Clear Time (g_c+I1), s	7.6	9.9	3.9	3.6	3.4	13.4	7.5	11.7
Green Ext Time (p_c), s	0.1	2.9	0.0	0.1	0.0	4.1	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	26.0
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	314	274	72	386	331	395
v/c Ratio	0.72	0.28	0.10	0.62	0.65	0.53
Control Delay	36.5	9.2	20.0	7.3	26.4	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	9.2	20.0	7.3	26.4	5.5
Queue Length 50th (ft)	76	39	10	0	83	0
Queue Length 95th (ft)	#415	126	27	34	239	37
Internal Link Dist (ft)		1856	434		221	
Turn Bay Length (ft)	180			250		
Base Capacity (vph)	508	1475	1500	893	699	864
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	0.62	0.19	0.05	0.43	0.47	0.46

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	270	236	58	313	268	320
Future Volume (veh/h)	270	236	58	313	268	320
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	314	274	72	293	331	302
Peak Hour Factor	0.86	0.86	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	385	1033	844	376	447	398
Arrive On Green	0.22	0.55	0.24	0.24	0.25	0.25
Sat Flow, veh/h	1781	1870	3647	1585	1781	1585
Grp Volume(v), veh/h	314	274	72	293	331	302
Grp Sat Flow(s),veh/h/ln	1781	1870	1777	1585	1781	1585
Q Serve(g_s), s	7.8	3.6	0.7	8.1	8.0	8.2
Cycle Q Clear(g_c), s	7.8	3.6	0.7	8.1	8.0	8.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	385	1033	844	376	447	398
V/C Ratio(X)	0.81	0.27	0.09	0.78	0.74	0.76
Avail Cap(c_a), veh/h	572	1033	1521	678	724	645
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	17.4	5.5	13.9	16.7	16.1	16.2
Incr Delay (d2), s/veh	5.6	0.1	0.0	3.5	2.4	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.9	0.3	2.8	2.9	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.1	5.6	13.9	20.2	18.5	19.2
LnGrp LOS	C	A	B	C	B	B
Approach Vol, veh/h		588	365		633	
Approach Delay, s/veh		14.9	18.9		18.9	
Approach LOS		B	B		B	

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				30.4		16.3	14.7	15.7
Change Period (Y+Rc), s				4.6		4.6	4.6	4.6
Max Green Setting (Gmax), s				15.0		19.0	15.0	20.0
Max Q Clear Time (g_c+I1), s				5.6		10.2	9.8	10.1
Green Ext Time (p_c), s				1.0		1.5	0.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	62.3
Intersection LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	424	155	55	224	190	110
Future Vol, veh/h	424	155	55	224	190	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	565	207	86	350	306	177
Number of Lanes	1	1	0	1	1	0

Approach	EB		WB		NB	
Opposing Approach	WB		EB			
Opposing Lanes	1		2		0	
Conflicting Approach Left			NB		EB	
Conflicting Lanes Left	0		1		2	
Conflicting Approach Right	NB				WB	
Conflicting Lanes Right	1		0		1	
HCM Control Delay	87		37.2		45.4	
HCM LOS	F		E		E	

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	63%	0%	0%	20%
Vol Thru, %	0%	100%	0%	80%
Vol Right, %	37%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	300	424	155	279
LT Vol	190	0	0	55
Through Vol	0	424	0	224
RT Vol	110	0	155	0
Lane Flow Rate	484	565	207	436
Geometry Grp	2	7	7	5
Degree of Util (X)	0.901	1.15	0.379	0.837
Departure Headway (Hd)	6.983	7.322	6.602	7.206
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	523	497	548	506
Service Time	4.983	5.022	4.302	5.206
HCM Lane V/C Ratio	0.925	1.137	0.378	0.862
HCM Control Delay	45.4	114	13.3	37.2
HCM Lane LOS	E	F	B	E
HCM 95th-tile Q	10.4	19.9	1.8	8.4

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	532	271	2	7	8
Future Vol, veh/h	2	532	271	2	7	8
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	75	75	64	64	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	709	423	3	8	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	426	0	-	0	1140	425
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	715	-
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	1133	-	-	-	222	629
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	485	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1133	-	-	-	221	629
Mov Cap-2 Maneuver	-	-	-	-	221	-
Stage 1	-	-	-	-	656	-
Stage 2	-	-	-	-	485	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1133	-	-	-	338
HCM Lane V/C Ratio	0.002	-	-	-	0.048
HCM Control Delay (s)	8.2	0	-	-	16.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	537	267	3	9	6
Future Vol, veh/h	2	537	267	3	9	6
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	56	56	55	55	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	959	485	5	10	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	490	0	-	0	1455	488
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	967	-
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	1073	-	-	-	143	580
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	369	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1073	-	-	-	142	580
Mov Cap-2 Maneuver	-	-	-	-	142	-
Stage 1	-	-	-	-	612	-
Stage 2	-	-	-	-	369	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	24.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1073	-	-	-	203
HCM Lane V/C Ratio	0.003	-	-	-	0.08
HCM Control Delay (s)	8.4	0	-	-	24.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Intersection Delay, s/veh	119
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	450	96	27	218	4	61	1	40	3	4	5
Future Vol, veh/h	1	450	96	27	218	4	61	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	804	171	49	396	7	86	1	56	5	7	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	182.7	20.2	12.8	11.1
HCM LOS	F	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	60%	0%	11%	25%
Vol Thru, %	1%	82%	88%	33%
Vol Right, %	39%	18%	2%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	102	547	249	12
LT Vol	61	1	27	3
Through Vol	1	450	218	4
RT Vol	40	96	4	5
Lane Flow Rate	144	977	453	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.261	1.349	0.677	0.039
Departure Headway (Hd)	7.257	4.971	5.841	7.745
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	499	723	625	465
Service Time	5.257	3.068	3.841	5.745
HCM Lane V/C Ratio	0.289	1.351	0.725	0.043
HCM Control Delay	12.8	182.7	20.2	11.1
HCM Lane LOS	B	F	C	B
HCM 95th-tile Q	1	40	5.2	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.1
Total Del/Veh (s)	8.4	16.5	16.6	15.6

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.5	0.0	0.0	0.2
Total Del/Veh (s)	18.0	16.2	11.4	16.1

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.6	0.6	0.0	0.1	0.6
Total Del/Veh (s)	44.1	12.7	17.5	19.0	20.8

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.7	0.0	0.0	0.5
Total Del/Veh (s)	19.5	7.0	10.4	12.1

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	7.6	8.7	6.5	7.7

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	2.9	0.2	4.6	1.5

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.6	2.7	7.1	1.8

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	7.8	8.9	4.9	4.4	8.0

9: MAIN ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.2	0.3
Total Del/Veh (s)	12.3	8.3	14.6	3.8	10.6

Total Zone Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	500.4

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	92	239	186	258
Average Queue (ft)	49	115	60	112
95th Queue (ft)	77	210	174	216
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		8		
Queuing Penalty (veh)		18		

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	380	105	353	225	48	116
Average Queue (ft)	126	95	172	79	13	61
95th Queue (ft)	305	118	306	188	39	102
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			2	0		
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	1	29				
Queuing Penalty (veh)	7	37				

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	292	150	63	80	174	113	191	201	220	220	178
Average Queue (ft)	140	18	23	24	78	47	100	87	110	87	76
95th Queue (ft)	272	108	50	61	136	88	164	163	189	164	139
Link Distance (ft)		705			722		300	300		430	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	315		150	300		250			210		210
Storage Blk Time (%)	1								2	0	0
Queuing Penalty (veh)	1								9	1	0

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	R	L	R
Maximum Queue (ft)	256	155	50	50	110	222	92
Average Queue (ft)	127	24	27	13	60	119	37
95th Queue (ft)	213	88	50	43	91	200	69
Link Distance (ft)		1899	436	436		229	229
Upstream Blk Time (%)						0	
Queuing Penalty (veh)						1	
Storage Bay Dist (ft)	180				250		
Storage Blk Time (%)	3	0					
Queuing Penalty (veh)	3	0					

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	119	107	105	96
Average Queue (ft)	62	51	55	45
95th Queue (ft)	98	85	85	77
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	41	30
Average Queue (ft)	3	7
95th Queue (ft)	19	28
Link Distance (ft)	708	597
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	37	36
Average Queue (ft)	3	9
95th Queue (ft)	19	32
Link Distance (ft)	304	584
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	121	89	62	31
Average Queue (ft)	53	51	30	12
95th Queue (ft)	87	77	57	37
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: MAIN ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	333	127	274	71
Average Queue (ft)	94	55	80	25
95th Queue (ft)	239	103	217	61
Link Distance (ft)	922	810	1297	1094
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 79

Intersection	
Intersection Delay, s/veh	28.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	155	1	5	494	235	0	0	130	275
Future Vol, veh/h	0	0	0	155	1	5	494	235	0	0	130	275
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.95	0.95	0.95	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	8	5	6	2	2	12	2
Mvmt Flow	0	0	0	194	1	6	520	247	0	0	157	331
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	14.2	36.1	22.6
HCM LOS	B	E	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	96%	0%
Vol Thru, %	0%	100%	1%	32%
Vol Right, %	0%	0%	3%	68%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	494	235	161	405
LT Vol	494	0	155	0
Through Vol	0	235	1	130
RT Vol	0	0	5	275
Lane Flow Rate	520	247	201	488
Geometry Grp	7	7	2	5
Degree of Util (X)	0.927	0.407	0.385	0.741
Departure Headway (Hd)	6.419	5.929	6.887	5.465
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	567	606	521	659
Service Time	4.164	3.674	4.939	3.508
HCM Lane V/C Ratio	0.917	0.408	0.386	0.741
HCM Control Delay	47.2	12.7	14.2	22.6
HCM Lane LOS	E	B	B	C
HCM 95th-tile Q	11.6	2	1.8	6.6

Intersection	
Intersection Delay, s/veh	88.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	1	506	0	0	0	0	604	300	15	265	0
Future Vol, veh/h	125	1	506	0	0	0	0	604	300	15	265	0
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.95	0.95	0.95	0.77	0.77	0.77
Heavy Vehicles, %	6	2	7	2	2	2	2	4	15	8	8	2
Mvmt Flow	129	1	522	0	0	0	0	636	316	19	344	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	55.1	132.4	33.1
HCM LOS	F	F	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	604	300	126	506	15	265
LT Vol	0	0	125	0	15	0
Through Vol	604	0	1	0	0	265
RT Vol	0	300	0	506	0	0
Lane Flow Rate	636	316	130	522	19	344
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.337	0.618	0.293	0.992	0.046	0.768
Departure Headway (Hd)	7.57	7.041	8.551	7.252	9.024	8.505
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	483	512	423	506	399	427
Service Time	5.35	4.82	6.251	4.952	6.724	6.205
HCM Lane V/C Ratio	1.317	0.617	0.307	1.032	0.048	0.806
HCM Control Delay	187.9	20.7	14.8	65.1	12.2	34.3
HCM Lane LOS	F	C	B	F	B	D
HCM 95th-tile Q	28.2	4.1	1.2	13.3	0.1	6.5

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	218	18	61	28	266	87	648	189	598
v/c Ratio	1.10	0.03	0.10	0.20	0.54	0.54	0.68	0.81	0.50
Control Delay	127.1	19.9	0.3	39.2	8.3	49.5	26.6	60.5	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.1	19.9	0.3	39.2	8.3	49.5	26.6	60.5	19.7
Queue Length 50th (ft)	~84	4	0	10	4	31	106	68	85
Queue Length 95th (ft)	#339	21	0	47	58	#144	240	#301	216
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	198	636	622	144	597	160	1596	232	1686
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	1.10	0.03	0.10	0.19	0.45	0.54	0.41	0.81	0.35

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	15	52	26	10	240	76	484	80	185	476	110
Future Volume (veh/h)	185	15	52	26	10	240	76	484	80	185	476	110
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	1663	1870	1826	1663	1870	1856	1856	1870	1870	1737	1781	1856
Adj Flow Rate, veh/h	218	18	61	28	11	255	87	556	92	189	486	112
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	16	2	5	16	2	3	3	2	2	11	8	3
Cap, veh/h	206	541	447	58	13	299	130	769	127	228	864	198
Arrive On Green	0.13	0.29	0.29	0.04	0.20	0.20	0.07	0.25	0.25	0.14	0.32	0.32
Sat Flow, veh/h	1584	1870	1547	1584	66	1529	1767	3053	504	1654	2735	627
Grp Volume(v), veh/h	218	18	61	28	0	266	87	323	325	189	300	298
Grp Sat Flow(s),veh/h/ln	1584	1870	1547	1584	0	1595	1767	1777	1780	1654	1692	1669
Q Serve(g_s), s	8.4	0.4	1.9	1.1	0.0	10.4	3.1	10.7	10.8	7.2	9.5	9.6
Cycle Q Clear(g_c), s	8.4	0.4	1.9	1.1	0.0	10.4	3.1	10.7	10.8	7.2	9.5	9.6
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.28	1.00		0.38
Lane Grp Cap(c), veh/h	206	541	447	58	0	312	130	447	448	228	535	527
V/C Ratio(X)	1.06	0.03	0.14	0.48	0.00	0.85	0.67	0.72	0.73	0.83	0.56	0.57
Avail Cap(c_a), veh/h	206	541	447	150	0	346	164	825	827	241	786	775
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.1	16.5	17.0	30.5	0.0	25.1	29.2	22.1	22.1	27.1	18.4	18.4
Incr Delay (d2), s/veh	78.9	0.0	0.1	6.1	0.0	16.9	7.1	2.2	2.3	20.3	0.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	0.2	0.6	0.5	0.0	5.2	1.5	4.3	4.3	3.9	3.4	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	107.0	16.5	17.1	36.6	0.0	42.0	36.3	24.3	24.4	47.4	19.3	19.4
LnGrp LOS	F	B	B	D	A	D	D	C	C	D	B	B
Approach Vol, veh/h		297			294			735			787	
Approach Delay, s/veh		83.1			41.5			25.7			26.1	
Approach LOS		F			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	20.9	7.0	23.3	9.3	25.0	13.0	17.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	9.4	30.0	6.1	11.7	6.0	30.0	8.4	14.0
Max Q Clear Time (g_c+I1), s	9.2	12.8	3.1	3.9	5.1	11.6	10.4	12.4
Green Ext Time (p_c), s	0.0	3.5	0.0	0.1	0.0	3.3	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	36.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	362	94	84	357	325	179
v/c Ratio	0.76	0.09	0.12	0.60	0.66	0.31
Control Delay	37.8	7.9	20.0	7.2	27.2	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.8	7.9	20.0	7.2	27.2	5.4
Queue Length 50th (ft)	90	12	11	0	81	0
Queue Length 95th (ft)	#498	49	34	56	269	47
Internal Link Dist (ft)		1856	434		221	
Turn Bay Length (ft)	180			250		
Base Capacity (vph)	494	1449	1462	864	682	720
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	0.73	0.06	0.06	0.41	0.48	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	315	82	76	325	309	170
Future Volume (veh/h)	315	82	76	325	309	170
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	362	94	84	275	325	100
Peak Hour Factor	0.87	0.87	0.91	0.91	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	434	1065	807	360	415	369
Arrive On Green	0.24	0.57	0.23	0.23	0.23	0.23
Sat Flow, veh/h	1781	1870	3647	1585	1781	1585
Grp Volume(v), veh/h	362	94	84	275	325	100
Grp Sat Flow(s),veh/h/ln	1781	1870	1777	1585	1781	1585
Q Serve(g_s), s	9.0	1.1	0.9	7.5	8.0	2.4
Cycle Q Clear(g_c), s	9.0	1.1	0.9	7.5	8.0	2.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	434	1065	807	360	415	369
V/C Ratio(X)	0.84	0.09	0.10	0.76	0.78	0.27
Avail Cap(c_a), veh/h	574	1065	1527	681	727	647
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.7	4.5	14.2	16.8	16.7	14.6
Incr Delay (d2), s/veh	8.0	0.0	0.1	3.4	3.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.3	0.3	2.6	3.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.7	4.6	14.3	20.2	20.0	15.0
LnGrp LOS	C	A	B	C	C	B
Approach Vol, veh/h		456	359		425	
Approach Delay, s/veh		20.6	18.8		18.8	
Approach LOS		C	B		B	

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				31.1		15.4	15.9	15.2
Change Period (Y+Rc), s				4.6		4.6	4.6	4.6
Max Green Setting (Gmax), s				15.0		19.0	15.0	20.0
Max Q Clear Time (g_c+I1), s				3.1		10.0	11.0	9.5
Green Ext Time (p_c), s				0.3		0.9	0.5	1.0

Intersection Summary	
HCM 6th Ctrl Delay	19.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	270	220	75	264	165	60
Future Vol, veh/h	270	220	75	264	165	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	329	268	84	297	185	67
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	13.4	16.6	13.8
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	73%	0%	0%	22%
Vol Thru, %	0%	100%	0%	78%
Vol Right, %	27%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	225	270	220	339
LT Vol	165	0	0	75
Through Vol	0	270	0	264
RT Vol	60	0	220	0
Lane Flow Rate	253	329	268	381
Geometry Grp	2	7	7	5
Degree of Util (X)	0.431	0.536	0.384	0.595
Departure Headway (Hd)	6.132	5.856	5.146	5.62
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	587	616	698	640
Service Time	4.177	3.596	2.886	3.66
HCM Lane V/C Ratio	0.431	0.534	0.384	0.595
HCM Control Delay	13.8	15.2	11.1	16.6
HCM Lane LOS	B	C	B	C
HCM 95th-tile Q	2.2	3.2	1.8	3.9

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	322	334	7	4	5
Future Vol, veh/h	8	322	334	7	4	5
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	82	82	89	89	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	393	375	8	4	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	383	0	-	0	792	379
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	413	-
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	1175	-	-	-	358	668
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	668	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1175	-	-	-	354	668
Mov Cap-2 Maneuver	-	-	-	-	354	-
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	668	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1175	-	-	-	479
HCM Lane V/C Ratio	0.008	-	-	-	0.02
HCM Control Delay (s)	8.1	0	-	-	12.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	319	337	8	5	4
Future Vol, veh/h	7	319	337	8	5	4
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	73	73	90	90	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	437	374	9	5	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	383	0	-	0	836	379
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	457	-
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	1175	-	-	-	337	668
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1175	-	-	-	333	668
Mov Cap-2 Maneuver	-	-	-	-	333	-
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	638	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	13.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1175	-	-	-	429
HCM Lane V/C Ratio	0.008	-	-	-	0.023
HCM Control Delay (s)	8.1	0	-	-	13.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

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	6	298	41	20	309	8	41	2	20	7	1	5
Future Vol, veh/h	6	298	41	20	309	8	41	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	408	56	22	343	9	51	3	25	13	2	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.4	12.4	9.7	9.2
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	65%	2%	6%	54%
Vol Thru, %	3%	86%	92%	8%
Vol Right, %	32%	12%	2%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	63	345	337	13
LT Vol	41	6	20	7
Through Vol	2	298	309	1
RT Vol	20	41	8	5
Lane Flow Rate	79	473	374	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.129	0.601	0.493	0.04
Departure Headway (Hd)	5.875	4.58	4.738	5.95
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	613	785	756	605
Service Time	3.877	2.643	2.807	3.954
HCM Lane V/C Ratio	0.129	0.603	0.495	0.04
HCM Control Delay	9.7	14.4	12.4	9.2
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.4	4.1	2.8	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.1	0.6	0.2
Total Del/Veh (s)	29.5	14.3	31.2	21.1

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.7	18.2	11.3	10.7
Total Del/Veh (s)	118.1	45.6	86.1	79.7

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	17.5	1.0	0.2	0.1	2.3
Total Del/Veh (s)	101.0	19.1	37.5	19.5	34.2

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.3	0.0	0.1	0.0	0.5
Total Del/Veh (s)	17.3	9.7	44.1	12.0	13.5

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	1.9	0.0	0.3	1.0
Total Del/Veh (s)	43.2	30.3	45.8	40.5

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.5	0.1	0.2	0.1	0.3
Total Del/Veh (s)	16.8	9.5	5.8	4.9	13.1

Total Zone Performance

Denied Del/Veh (s)	9.2
Total Del/Veh (s)	1237.4

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	370	219	170	345
Average Queue (ft)	122	97	68	119
95th Queue (ft)	299	173	126	376
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				1
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		2		
Queuing Penalty (veh)		9		

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	1500	105	467	479	304	642
Average Queue (ft)	764	103	364	237	24	333
95th Queue (ft)	1779	115	554	530	153	704
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)			12	2		3
Queuing Penalty (veh)			54	11		14
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	11	68				53
Queuing Penalty (veh)	55	157				3

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	328	510	66	122	221	204	310	320	31	46	201	283
Average Queue (ft)	198	159	26	45	90	49	151	148	1	3	89	92
95th Queue (ft)	375	590	55	96	170	162	302	305	19	32	159	202
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		8				0	4	4	0	0		0
Queuing Penalty (veh)		0				0	11	11	0	0		0
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	21				0		8				0	0
Queuing Penalty (veh)	17				0		4				0	1

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	300
Average Queue (ft)	153
95th Queue (ft)	256
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	2
Queuing Penalty (veh)	11

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	T	T	R	L	T	L	T	R
Maximum Queue (ft)	257	234	5	68	71	118	12	50	219	29	166
Average Queue (ft)	133	71	0	36	26	61	1	11	124	4	76
95th Queue (ft)	223	160	2	60	61	95	7	37	203	18	133
Link Distance (ft)		1886	1886	436	436		944	944	223	223	223
Upstream Blk Time (%)									1		0
Queuing Penalty (veh)									1		0
Storage Bay Dist (ft)	180					250					
Storage Blk Time (%)	3	0									
Queuing Penalty (veh)	9	1									

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	B29	B29	WB	NB
Directions Served	T	R	T	T	LT	LR
Maximum Queue (ft)	695	549	39	33	446	637
Average Queue (ft)	252	115	7	6	122	162
95th Queue (ft)	626	404	75	69	342	504
Link Distance (ft)	758	758	238	238	708	1311
Upstream Blk Time (%)	4	1	1	1	0	
Queuing Penalty (veh)	11	3	4	2	1	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	234	157	74	34
Average Queue (ft)	111	57	40	10
95th Queue (ft)	235	117	63	33
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	14			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 405

Intersection	
Intersection Delay, s/veh	60.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	315	0	10	470	365	0	0	134	140
Future Vol, veh/h	0	0	0	315	0	10	470	365	0	0	134	140
Peak Hour Factor	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.92	0.92	0.76	0.76
Heavy Vehicles, %	2	2	2	2	67	8	9	5	2	2	4	8
Mvmt Flow	0	0	0	463	0	15	540	420	0	0	176	184
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	45.5	82.2	22.2
HCM LOS	E	F	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	97%	0%
Vol Thru, %	0%	100%	0%	49%
Vol Right, %	0%	0%	3%	51%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	470	365	325	274
LT Vol	470	0	315	0
Through Vol	0	365	0	134
RT Vol	0	0	10	140
Lane Flow Rate	540	420	478	361
Geometry Grp	7	7	2	5
Degree of Util (X)	1.156	0.83	0.903	0.663
Departure Headway (Hd)	7.701	7.118	6.943	6.806
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	470	508	526	534
Service Time	5.455	4.872	4.943	4.806
HCM Lane V/C Ratio	1.149	0.827	0.909	0.676
HCM Control Delay	118.1	36	45.5	22.2
HCM Lane LOS	F	E	E	C
HCM 95th-tile Q	19.4	8.3	10.5	4.8

Intersection	
Intersection Delay, s/veh	158.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	230	0	491	0	0	0	0	604	288	5	450	0
Future Vol, veh/h	230	0	491	0	0	0	0	604	288	5	450	0
Peak Hour Factor	0.82	0.82	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.73	0.73	0.92
Heavy Vehicles, %	6	14	11	2	2	2	2	9	14	17	5	2
Mvmt Flow	280	0	599	0	0	0	0	657	313	7	616	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	101.7	164.7	228.5
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	100%	0%	100%	0%
Vol Thru, %	100%	0%	0%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	604	288	230	491	5	450
LT Vol	0	0	230	0	5	0
Through Vol	604	0	0	0	0	450
RT Vol	0	288	0	491	0	0
Lane Flow Rate	657	313	280	599	7	616
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.434	0.631	0.647	1.204	0.017	1.427
Departure Headway (Hd)	8.674	8.03	9.075	7.962	9.905	9.171
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	427	454	401	461	364	401
Service Time	6.374	5.73	6.775	5.662	7.605	6.871
HCM Lane V/C Ratio	1.539	0.689	0.698	1.299	0.019	1.536
HCM Control Delay	232	23.5	27	136.7	12.8	230.9
HCM Lane LOS	F	C	D	F	B	F
HCM 95th-tile Q	30	4.3	4.4	21.2	0.1	28.4

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	27	65	60	285	56	658	179	915
v/c Ratio	0.74	0.05	0.10	0.40	0.60	0.41	0.74	0.71	0.69
Control Delay	52.7	23.0	0.3	47.0	11.1	49.7	31.9	51.5	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	23.0	0.3	47.0	11.1	49.7	31.9	51.5	24.1
Queue Length 50th (ft)	81	10	0	27	10	25	138	78	184
Queue Length 95th (ft)	#268	31	0	#93	75	#92	262	#238	349
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	304	570	650	166	524	138	1058	295	1384
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	0.62	0.05	0.10	0.36	0.54	0.41	0.62	0.61	0.66

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)	172	25	59	56	20	245	49	466	106	154	622	165
Future Volume (veh/h)	172	25	59	56	20	245	49	466	106	154	622	165
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	1530	1781	1856	1663	1870	1870	1767	1856	1767	1722	1796	1737
Adj Flow Rate, veh/h	189	27	65	60	22	263	56	536	122	179	723	192
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.87	0.87	0.87	0.86	0.86	0.86
Percent Heavy Veh, %	25	8	3	16	2	2	9	3	9	12	7	11
Cap, veh/h	225	474	418	96	21	254	98	748	170	219	900	239
Arrive On Green	0.15	0.27	0.27	0.06	0.17	0.17	0.06	0.26	0.26	0.13	0.34	0.34
Sat Flow, veh/h	1457	1781	1572	1584	124	1480	1682	2855	647	1640	2667	708
Grp Volume(v), veh/h	189	27	65	60	0	285	56	330	328	179	463	452
Grp Sat Flow(s),veh/h/ln	1457	1781	1572	1584	0	1604	1682	1763	1739	1640	1706	1669
Q Serve(g_s), s	8.4	0.7	2.1	2.5	0.0	11.4	2.2	11.3	11.4	7.0	16.3	16.3
Cycle Q Clear(g_c), s	8.4	0.7	2.1	2.5	0.0	11.4	2.2	11.3	11.4	7.0	16.3	16.3
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.37	1.00		0.42
Lane Grp Cap(c), veh/h	225	474	418	96	0	276	98	462	456	219	576	563
V/C Ratio(X)	0.84	0.06	0.16	0.63	0.00	1.03	0.57	0.71	0.72	0.82	0.80	0.80
Avail Cap(c_a), veh/h	338	510	451	186	0	276	155	569	561	331	739	722
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	18.1	18.6	30.4	0.0	27.5	30.4	22.2	22.2	27.9	20.0	20.0
Incr Delay (d2), s/veh	11.1	0.0	0.2	6.5	0.0	63.2	5.2	3.3	3.4	9.1	5.0	5.1
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	3.5	0.3	0.7	1.1	0.0	9.0	1.0	4.6	4.6	3.1	6.4	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.3	18.2	18.8	37.0	0.0	90.6	35.6	25.5	25.7	37.0	24.9	25.1
LnGrp LOS	D	B	B	D	A	F	D	C	C	D	C	C
Approach Vol, veh/h		281			345			714			1094	
Approach Delay, s/veh		31.9			81.3			26.4			27.0	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	22.0	8.6	22.2	8.5	27.0	14.9	16.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	13.4	21.4	7.8	19.0	6.1	28.7	15.4	11.4
Max Q Clear Time (g_c+I1), s	9.0	13.4	4.5	4.1	4.2	18.3	10.4	13.4
Green Ext Time (p_c), s	0.2	2.4	0.0	0.2	0.0	4.1	0.2	0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.1
HCM 6th LOS	D

Notes
User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	413	351	1	162	427	1	12	359	10	498
v/c Ratio	0.70	0.33	0.00	0.27	0.68	0.01	0.06	0.79	0.02	0.62
Control Delay	33.5	10.3	0.0	28.8	9.3	47.0	37.1	44.1	26.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	10.3	0.0	28.8	9.3	47.0	37.1	44.1	26.2	6.7
Queue Length 50th (ft)	134	65	0	31	0	0	5	131	3	0
Queue Length 95th (ft)	#545	196	0	70	38	7	25	#525	19	40
Internal Link Dist (ft)		1856		434			916		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	721	1195	1065	1020	760	124	950	457	1300	1255
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	0.57	0.29	0.00	0.16	0.56	0.01	0.01	0.79	0.01	0.40

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)	355	302	1	0	131	346	1	10	0	291	8	403
Future Volume (veh/h)	355	302	1	0	131	346	1	10	0	291	8	403
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	413	351	1	0	162	334	1	12	0	359	10	405
Peak Hour Factor	0.86	0.86	0.86	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	463	1009	855	2	791	353	2	125	106	396	538	456
Arrive On Green	0.26	0.54	0.54	0.00	0.22	0.22	0.00	0.07	0.00	0.22	0.29	0.29
Sat Flow, veh/h	1781	1870	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	413	351	1	0	162	334	1	12	0	359	10	405
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	18.0	8.6	0.0	0.0	3.0	16.7	0.0	0.5	0.0	15.8	0.3	19.7
Cycle Q Clear(g_c), s	18.0	8.6	0.0	0.0	3.0	16.7	0.0	0.5	0.0	15.8	0.3	19.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	463	1009	855	2	791	353	2	125	106	396	538	456
V/C Ratio(X)	0.89	0.35	0.00	0.00	0.20	0.95	0.41	0.10	0.00	0.91	0.02	0.89
Avail Cap(c_a), veh/h	642	1009	855	111	791	353	111	844	715	407	1156	979
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	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	10.5	8.5	0.0	25.5	30.8	40.1	35.2	0.0	30.5	20.5	27.4
Incr Delay (d2), s/veh	11.5	0.2	0.0	0.0	0.1	34.3	83.6	0.3	0.0	23.2	0.0	6.0
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	8.7	3.2	0.0	0.0	1.2	9.4	0.1	0.2	0.0	8.9	0.1	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	10.7	8.5	0.0	25.6	65.1	123.7	35.6	0.0	53.7	20.5	33.4
LnGrp LOS	D	B	A	A	C	E	F	D	A	D	C	C
Approach Vol, veh/h		765			496			13			774	
Approach Delay, s/veh		26.6			52.2			42.4			42.7	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.5	10.0	0.0	48.0	4.7	27.7	25.5	22.5
Change Period (Y+Rc), s	4.6	4.6	4.5	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	18.4	36.3	5.0	42.0	5.0	49.7	29.0	17.9
Max Q Clear Time (g_c+I1), s	17.8	2.5	0.0	10.6	2.0	21.7	20.0	18.7
Green Ext Time (p_c), s	0.1	0.0	0.0	2.2	0.0	1.5	0.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	39.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	122.5
Intersection LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	485	184	55	302	239	110
Future Vol, veh/h	485	184	55	302	239	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	647	245	86	472	385	177
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	152.5	102.4	95
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	68%	0%	0%	15%
Vol Thru, %	0%	100%	0%	85%
Vol Right, %	32%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	349	485	184	357
LT Vol	239	0	0	55
Through Vol	0	485	0	302
RT Vol	110	0	184	0
Lane Flow Rate	563	647	245	558
Geometry Grp	2	7	7	5
Degree of Util (X)	1.091	1.371	0.472	1.109
Departure Headway (Hd)	7.488	8.178	7.452	7.803
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	490	453	486	469
Service Time	5.488	5.878	5.152	5.803
HCM Lane V/C Ratio	1.149	1.428	0.504	1.19
HCM Control Delay	95	204	16.6	102.4
HCM Lane LOS	F	F	C	F
HCM 95th-tile Q	17	28.4	2.5	17.3

Intersection	
Intersection Delay, s/veh	185.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	1	486	110	25	287	4	82	1	40	3	4	5
Future Vol, veh/h	1	486	110	25	287	4	82	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	868	196	45	522	7	115	1	56	5	7	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	295.7	39.6	14.7	12.1
HCM LOS	F	E	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	0%	8%	25%
Vol Thru, %	1%	81%	91%	33%
Vol Right, %	33%	18%	1%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	597	316	12
LT Vol	82	1	25	3
Through Vol	1	486	287	4
RT Vol	40	110	4	5
Lane Flow Rate	173	1066	575	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.329	1.608	0.884	0.042
Departure Headway (Hd)	7.913	5.429	6.282	8.709
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	457	682	580	414
Service Time	5.913	3.431	4.282	6.709
HCM Lane V/C Ratio	0.379	1.563	0.991	0.048
HCM Control Delay	14.7	295.7	39.6	12.1
HCM Lane LOS	B	F	E	B
HCM 95th-tile Q	1.4	57.3	10.2	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	1.9	0.9	1.3
Total Del/Veh (s)	17.6	45.0	43.7	39.1

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	114.2	10.7	3.5	43.5
Total Del/Veh (s)	343.0	46.5	64.0	139.3

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	197.8	0.8	4.6	2.0	29.2
Total Del/Veh (s)	231.2	25.6	87.7	40.9	78.9

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	12.0	0.0	0.1	0.0	4.4
Total Del/Veh (s)	99.4	21.3	35.2	50.4	59.4

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.1
Total Del/Veh (s)	9.7	13.0	8.2	10.5

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	8.5	10.7	5.5	4.6	9.2

9: MAIN ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.1	0.3	0.4	0.3	1.0
Total Del/Veh (s)	32.1	12.3	41.0	5.0	26.1

Total Zone Performance

Denied Del/Veh (s)	36.0
Total Del/Veh (s)	1352.2

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	241	270	531	601
Average Queue (ft)	93	207	230	198
95th Queue (ft)	177	318	611	509
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)			1	1
Queuing Penalty (veh)			5	0
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		50		
Queuing Penalty (veh)		122		

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	2617	105	472	483	305	620
Average Queue (ft)	1838	105	430	351	45	262
95th Queue (ft)	3264	111	520	595	202	583
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)	48		18	5		2
Queuing Penalty (veh)	0		105	28		8
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	5	96				39
Queuing Penalty (veh)	31	122				6

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	340	761	85	104	234	300	395	414	163	174	286	416
Average Queue (ft)	294	496	22	35	106	198	309	309	94	93	128	199
95th Queue (ft)	435	1020	60	86	190	400	470	476	215	217	258	426
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		52				1	55	52	42	36		7
Queuing Penalty (veh)		0				0	239	222	118	102		76
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	64		0		0	0	61				1	21
Queuing Penalty (veh)	51		0		0	0	52				6	145

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	322
Average Queue (ft)	194
95th Queue (ft)	343
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	11
Queuing Penalty (veh)	61

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	T	T	R	L	T	L	T	R
Maximum Queue (ft)	270	1423	486	123	222	276	31	87	239	48	159
Average Queue (ft)	220	528	172	53	62	104	6	43	224	10	66
95th Queue (ft)	318	1596	1061	94	179	225	24	82	256	35	127
Link Distance (ft)		1886	1886	436	436		1199	1199	223	223	223
Upstream Blk Time (%)		9	3		0				65		
Queuing Penalty (veh)		0	0		1				175		
Storage Bay Dist (ft)	180					250					
Storage Blk Time (%)	37	0				4					
Queuing Penalty (veh)	83	0				4					

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	194	100	195	115
Average Queue (ft)	82	53	84	54
95th Queue (ft)	142	81	159	90
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	129	120	64	34
Average Queue (ft)	65	62	34	10
95th Queue (ft)	105	94	55	33
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: MAIN ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	497	199	662	105
Average Queue (ft)	234	77	196	40
95th Queue (ft)	499	157	513	82
Link Distance (ft)	922	810	1297	1094
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 1760

Intersection	
Intersection Delay, s/veh	90.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑			↱	
Traffic Vol, veh/h	0	0	0	292	1	5	626	243	0	0	139	275
Future Vol, veh/h	0	0	0	292	1	5	626	243	0	0	139	275
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.95	0.95	0.95	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	8	5	6	2	2	12	2
Mvmt Flow	0	0	0	365	1	6	659	256	0	0	167	331
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	27.8	144.1	38.4
HCM LOS	D	F	E

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	98%	0%
Vol Thru, %	0%	100%	0%	34%
Vol Right, %	0%	0%	2%	66%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	626	243	298	414
LT Vol	626	0	292	0
Through Vol	0	243	1	139
RT Vol	0	0	5	275
Lane Flow Rate	659	256	372	499
Geometry Grp	7	7	2	5
Degree of Util (X)	1.353	0.49	0.727	0.866
Departure Headway (Hd)	7.394	6.9	7.427	6.597
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	494	519	492	554
Service Time	5.166	4.672	5.427	4.597
HCM Lane V/C Ratio	1.334	0.493	0.756	0.901
HCM Control Delay	193.8	16.2	27.8	38.4
HCM Lane LOS	F	C	D	E
HCM 95th-tile Q	29.6	2.7	5.9	9.5

Intersection	
Intersection Delay, s/veh	189.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	1	646	0	0	0	0	745	447	15	410	0
Future Vol, veh/h	125	1	646	0	0	0	0	745	447	15	410	0
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.95	0.95	0.95	0.77	0.77	0.77
Heavy Vehicles, %	6	2	7	2	2	2	2	4	15	8	8	2
Mvmt Flow	129	1	666	0	0	0	0	784	471	19	532	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	152.4	234	143.8
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	745	447	126	646	15	410
LT Vol	0	0	125	0	15	0
Through Vol	745	0	1	0	0	410
RT Vol	0	447	0	646	0	0
Lane Flow Rate	784	471	130	666	19	532
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.683	0.943	0.302	1.316	0.047	1.221
Departure Headway (Hd)	8.803	8.265	8.9	7.59	9.762	9.24
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	423	442	407	486	369	399
Service Time	6.503	5.965	6.6	5.29	7.462	6.94
HCM Lane V/C Ratio	1.853	1.066	0.319	1.37	0.051	1.333
HCM Control Delay	339.2	58.7	15.4	179.1	12.9	148.6
HCM Lane LOS	F	F	C	F	B	F
HCM 95th-tile Q	41.2	11	1.3	27.3	0.1	19.8

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	286	18	75	41	282	99	908	198	879
v/c Ratio	0.91	0.03	0.13	0.34	0.65	0.66	0.88	0.89	0.70
Control Delay	67.5	21.9	0.5	48.3	14.1	61.5	40.2	76.8	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.5	21.9	0.5	48.3	14.1	61.5	40.2	76.8	27.4
Queue Length 50th (ft)	137	7	0	20	18	48	216	97	188
Queue Length 95th (ft)	#357	21	0	64	88	#153	#410	#300	361
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	326	641	620	127	500	156	1064	223	1247
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	0.88	0.03	0.12	0.32	0.56	0.63	0.85	0.89	0.70

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)	243	15	64	39	10	255	86	698	92	194	694	168
Future Volume (veh/h)	243	15	64	39	10	255	86	698	92	194	694	168
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	1663	1870	1826	1663	1870	1856	1856	1870	1870	1737	1781	1856
Adj Flow Rate, veh/h	286	18	75	41	11	271	99	802	106	198	708	171
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	16	2	5	16	2	3	3	2	2	11	8	3
Cap, veh/h	318	593	491	70	10	246	126	888	117	226	938	226
Arrive On Green	0.20	0.32	0.32	0.04	0.16	0.16	0.07	0.28	0.28	0.14	0.35	0.35
Sat Flow, veh/h	1584	1870	1547	1584	62	1532	1767	3155	417	1654	2704	653
Grp Volume(v), veh/h	286	18	75	41	0	282	99	452	456	198	443	436
Grp Sat Flow(s),veh/h/ln	1584	1870	1547	1584	0	1595	1767	1777	1795	1654	1692	1664
Q Serve(g_s), s	14.7	0.6	2.9	2.1	0.0	13.4	4.6	20.4	20.4	9.8	19.3	19.3
Cycle Q Clear(g_c), s	14.7	0.6	2.9	2.1	0.0	13.4	4.6	20.4	20.4	9.8	19.3	19.3
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.23	1.00		0.39
Lane Grp Cap(c), veh/h	318	593	491	70	0	256	126	500	505	226	587	577
V/C Ratio(X)	0.90	0.03	0.15	0.59	0.00	1.10	0.79	0.90	0.90	0.88	0.75	0.76
Avail Cap(c_a), veh/h	330	593	491	129	0	256	157	520	525	226	587	577
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.5	19.6	20.4	39.1	0.0	35.0	38.1	28.9	28.9	35.3	24.1	24.1
Incr Delay (d2), s/veh	25.6	0.0	0.1	7.6	0.0	86.0	18.6	18.6	18.5	29.6	5.5	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	0.2	1.0	1.0	0.0	11.2	2.6	10.6	10.7	5.6	8.0	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	19.7	20.6	46.7	0.0	121.0	56.7	47.5	47.4	64.9	29.6	29.8
LnGrp LOS	E	B	C	D	A	F	E	D	D	E	C	C
Approach Vol, veh/h		379			323			1007			1077	
Approach Delay, s/veh		48.9			111.6			48.4			36.2	
Approach LOS		D			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	28.1	8.3	31.1	10.5	33.5	21.3	18.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	11.4	24.4	6.8	19.0	7.4	28.4	17.4	13.4
Max Q Clear Time (g_c+I1), s	11.8	22.4	4.1	4.9	6.6	21.3	16.7	15.4
Green Ext Time (p_c), s	0.0	1.1	0.0	0.2	0.0	3.0	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	51.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	547	263	2	226	382	5	55	384	25	351
v/c Ratio	0.76	0.22	0.00	0.36	0.64	0.04	0.23	1.94	0.06	0.57
Control Delay	33.6	8.3	0.0	32.7	9.0	51.4	38.3	466.1	29.8	7.7
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	8.3	0.0	32.7	9.0	51.4	38.3	466.1	29.8	7.7
Queue Length 50th (ft)	219	51	0	54	0	2	26	~306	9	0
Queue Length 95th (ft)	#774	145	0	112	75	19	76	#809	41	78
Internal Link Dist (ft)		1856		434			1171		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	824	1250	1097	722	627	118	904	198	989	1005
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	0.66	0.21	0.00	0.31	0.61	0.04	0.06	1.94	0.03	0.35

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	476	229	2	0	206	348	5	52	0	365	24	333
Future Volume (veh/h)	476	229	2	0	206	348	5	52	0	365	24	333
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	547	263	2	0	226	300	5	55	0	384	25	272
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	611	1095	928	3	623	278	12	169	144	218	389	330
Arrive On Green	0.34	0.59	0.59	0.00	0.18	0.18	0.01	0.09	0.00	0.12	0.21	0.21
Sat Flow, veh/h	1781	1870	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	547	263	2	0	226	300	5	55	0	384	25	272
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	19.9	4.6	0.0	0.0	3.8	12.0	0.2	1.9	0.0	8.4	0.7	11.2
Cycle Q Clear(g_c), s	19.9	4.6	0.0	0.0	3.8	12.0	0.2	1.9	0.0	8.4	0.7	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	611	1095	928	3	623	278	12	169	144	218	389	330
V/C Ratio(X)	0.90	0.24	0.00	0.00	0.36	1.08	0.42	0.32	0.00	1.76	0.06	0.82
Avail Cap(c_a), veh/h	908	1147	972	130	623	278	130	994	842	218	1087	921
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	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	6.9	5.9	0.0	24.9	28.2	33.9	29.2	0.0	30.0	21.8	25.9
Incr Delay (d2), s/veh	8.1	0.1	0.0	0.0	0.4	77.0	22.3	1.1	0.0	359.2	0.1	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	1.5	0.0	0.0	1.5	10.2	0.2	0.9	0.0	25.1	0.3	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	7.0	5.9	0.0	25.2	105.3	56.2	30.3	0.0	389.2	21.8	31.1
LnGrp LOS	C	A	A	A	C	F	E	C	A	F	C	C
Approach Vol, veh/h		812			526			60			681	
Approach Delay, s/veh		22.1			70.9			32.4			232.7	
Approach LOS		C			E			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	10.8	0.0	44.7	5.0	18.9	28.1	16.6
Change Period (Y+Rc), s	4.6	* 4.6	4.5	4.6	4.5	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	* 36	5.0	42.0	5.0	39.8	34.9	12.0
Max Q Clear Time (g_c+I1), s	10.4	3.9	0.0	6.6	2.2	13.2	21.9	14.0
Green Ext Time (p_c), s	0.0	0.2	0.0	1.6	0.0	1.0	1.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	103.7
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	37.9
Intersection LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	422	287	75	406	220	60
Future Vol, veh/h	422	287	75	406	220	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	515	350	84	456	247	67
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	36.8	49.6	20.6
HCM LOS	E	E	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	79%	0%	0%	16%
Vol Thru, %	0%	100%	0%	84%
Vol Right, %	21%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	422	287	481
LT Vol	220	0	0	75
Through Vol	0	422	0	406
RT Vol	60	0	287	0
Lane Flow Rate	315	515	350	540
Geometry Grp	2	7	7	5
Degree of Util (X)	0.612	0.94	0.57	0.941
Departure Headway (Hd)	6.999	6.577	5.861	6.27
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	513	546	609	573
Service Time	5.079	4.375	3.659	4.35
HCM Lane V/C Ratio	0.614	0.943	0.575	0.942
HCM Control Delay	20.6	50.7	16.3	49.6
HCM Lane LOS	C	F	C	E
HCM 95th-tile Q	4.1	11.9	3.6	12.2

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	6	425	72	20	418	8	69	2	20	7	1	5
Future Vol, veh/h	6	425	72	20	418	8	69	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	582	99	22	464	9	86	3	25	13	2	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	46.9	21.6	11.8	10.5
HCM LOS	E	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	76%	1%	4%	54%
Vol Thru, %	2%	84%	94%	8%
Vol Right, %	22%	14%	2%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	503	446	13
LT Vol	69	6	20	7
Through Vol	2	425	418	1
RT Vol	20	72	8	5
Lane Flow Rate	114	689	496	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.216	0.961	0.732	0.047
Departure Headway (Hd)	6.824	5.019	5.316	7.036
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	524	723	679	506
Service Time	4.894	3.059	3.361	5.126
HCM Lane V/C Ratio	0.218	0.953	0.73	0.047
HCM Control Delay	11.8	46.9	21.6	10.5
HCM Lane LOS	B	E	C	B
HCM 95th-tile Q	0.8	14.4	6.4	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.3	0.1
Total Del/Veh (s)	42.8	16.8	34.6	26.2

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.7	12.6	13.5	8.6
Total Del/Veh (s)	158.0	43.4	88.0	94.2

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	46.5	1.0	0.7	0.1	6.0
Total Del/Veh (s)	107.4	19.8	45.3	20.2	37.5

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.3	0.0	0.1	0.0	0.5
Total Del/Veh (s)	18.6	10.8	42.3	12.3	14.3

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	2.7	0.0	0.4	1.4
Total Del/Veh (s)	35.7	38.6	52.2	40.7

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	3.5	0.3	7.9	2.4

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	12.8	0.0	0.1	8.1
Total Del/Veh (s)	10.0	2.6	81.8	8.4

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	2.1	0.1	0.2	0.1	1.2
Total Del/Veh (s)	18.5	9.8	6.0	4.7	14.1

Total Zone Performance

Denied Del/Veh (s)	12.8
Total Del/Veh (s)	976.5

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	453	230	223	405
Average Queue (ft)	157	110	78	126
95th Queue (ft)	439	206	190	371
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		7	0	
Queuing Penalty (veh)		29	0	

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	1935	105	457	453	232	641
Average Queue (ft)	1058	104	347	230	23	344
95th Queue (ft)	2254	113	549	522	152	718
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)			12	3		3
Queuing Penalty (veh)			52	12		15
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	11	80				54
Queuing Penalty (veh)	54	185				3

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	306	535	83	157	249	224	331	323	48	38	187	234
Average Queue (ft)	195	191	28	46	90	57	165	161	9	8	91	94
95th Queue (ft)	384	649	61	98	179	186	330	321	64	61	161	186
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		12				0	7	7	3	3		
Queuing Penalty (veh)		0				0	22	19	6	5		
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	27		0		0		11				0	0
Queuing Penalty (veh)	22		0		0		6				2	2

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	303
Average Queue (ft)	157
95th Queue (ft)	266
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	3
Queuing Penalty (veh)	16

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	T	T	R	L	T	L	T	R
Maximum Queue (ft)	259	278	8	84	110	142	11	44	218	34	176
Average Queue (ft)	139	79	0	38	31	67	0	11	126	5	77
95th Queue (ft)	228	192	4	66	80	124	6	36	200	22	139
Link Distance (ft)		1886	1886	436	436		944	944	223	223	223
Upstream Blk Time (%)									0		0
Queuing Penalty (veh)									1		0
Storage Bay Dist (ft)	180					250					
Storage Blk Time (%)	4	0				1					
Queuing Penalty (veh)	11	0				0					

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	B29	WB	NB
Directions Served	T	R	T	LT	LR
Maximum Queue (ft)	595	357	13	496	646
Average Queue (ft)	222	85	1	146	185
95th Queue (ft)	539	303	15	410	535
Link Distance (ft)	758	758	238	708	1311
Upstream Blk Time (%)	2	0		0	
Queuing Penalty (veh)	5	0		1	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	27	12	38
Average Queue (ft)	1	1	13
95th Queue (ft)	14	13	37
Link Distance (ft)	708	304	597
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	277	66
Average Queue (ft)	67	19
95th Queue (ft)	235	59
Link Distance (ft)	304	584
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	240	172	81	34
Average Queue (ft)	122	57	42	9
95th Queue (ft)	255	119	67	32
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	20			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 488

Intersection	
Intersection Delay, s/veh	61.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑			↱	
Traffic Vol, veh/h	0	0	0	315	0	10	475	365	0	0	134	140
Future Vol, veh/h	0	0	0	315	0	10	475	365	0	0	134	140
Peak Hour Factor	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.92	0.92	0.76	0.76
Heavy Vehicles, %	2	2	2	2	67	8	9	5	2	2	4	8
Mvmt Flow	0	0	0	463	0	15	546	420	0	0	176	184
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	43.5	84.8	22.1
HCM LOS	E	F	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	97%	0%
Vol Thru, %	0%	100%	0%	49%
Vol Right, %	0%	0%	3%	51%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	475	365	325	274
LT Vol	475	0	315	0
Through Vol	0	365	0	134
RT Vol	0	0	10	140
Lane Flow Rate	546	420	478	361
Geometry Grp	7	7	2	5
Degree of Util (X)	1.168	0.83	0.89	0.663
Departure Headway (Hd)	7.703	7.12	6.946	6.776
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	475	512	526	537
Service Time	5.422	4.839	4.946	4.776
HCM Lane V/C Ratio	1.149	0.82	0.909	0.672
HCM Control Delay	122.3	35.9	43.5	22.1
HCM Lane LOS	F	E	E	C
HCM 95th-tile Q	20	8.3	10.1	4.9

Intersection	
Intersection Delay, s/veh	160.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	230	0	492	0	0	0	0	609	288	5	450	0
Future Vol, veh/h	230	0	492	0	0	0	0	609	288	5	450	0
Peak Hour Factor	0.82	0.82	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.73	0.73	0.92
Heavy Vehicles, %	6	14	11	2	2	2	2	9	14	17	5	2
Mvmt Flow	280	0	600	0	0	0	0	662	313	7	616	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	102.5	168.5	228.6
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	100%	0%	100%	0%
Vol Thru, %	100%	0%	0%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	609	288	230	492	5	450
LT Vol	0	0	230	0	5	0
Through Vol	609	0	0	0	0	450
RT Vol	0	288	0	492	0	0
Lane Flow Rate	662	313	280	600	7	616
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.446	0.631	0.647	1.207	0.017	1.427
Departure Headway (Hd)	8.677	8.033	9.079	7.967	9.92	9.186
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	424	454	401	462	363	401
Service Time	6.377	5.733	6.779	5.667	7.62	6.886
HCM Lane V/C Ratio	1.561	0.689	0.698	1.299	0.019	1.536
HCM Control Delay	237.1	23.5	27	137.8	12.8	231
HCM Lane LOS	F	C	D	F	B	F
HCM 95th-tile Q	30.5	4.3	4.4	21.3	0.1	28.3

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	27	66	61	285	59	664	179	916
v/c Ratio	0.74	0.05	0.10	0.40	0.60	0.43	0.75	0.71	0.69
Control Delay	52.6	23.0	0.3	47.3	11.1	50.7	32.2	51.4	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	23.0	0.3	47.3	11.1	50.7	32.2	51.4	24.2
Queue Length 50th (ft)	81	10	0	27	10	27	140	78	184
Queue Length 95th (ft)	#268	31	0	#96	75	#100	265	#238	350
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	304	570	650	166	524	138	1056	295	1384
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	0.62	0.05	0.10	0.37	0.54	0.43	0.63	0.61	0.66

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)	172	25	60	57	20	245	51	471	107	154	623	165
Future Volume (veh/h)	172	25	60	57	20	245	51	471	107	154	623	165
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	1530	1781	1856	1663	1870	1870	1767	1856	1767	1722	1796	1737
Adj Flow Rate, veh/h	189	27	66	61	22	263	59	541	123	179	724	192
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.87	0.87	0.87	0.86	0.86	0.86
Percent Heavy Veh, %	25	8	3	16	2	2	9	3	9	12	7	11
Cap, veh/h	225	472	417	97	21	254	101	753	170	219	900	239
Arrive On Green	0.15	0.27	0.27	0.06	0.17	0.17	0.06	0.26	0.26	0.13	0.34	0.34
Sat Flow, veh/h	1457	1781	1572	1584	124	1480	1682	2855	647	1640	2668	707
Grp Volume(v), veh/h	189	27	66	61	0	285	59	333	331	179	463	453
Grp Sat Flow(s),veh/h/ln	1457	1781	1572	1584	0	1604	1682	1763	1739	1640	1706	1669
Q Serve(g_s), s	8.4	0.8	2.1	2.5	0.0	11.4	2.3	11.4	11.5	7.1	16.4	16.4
Cycle Q Clear(g_c), s	8.4	0.8	2.1	2.5	0.0	11.4	2.3	11.4	11.5	7.1	16.4	16.4
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.37	1.00		0.42
Lane Grp Cap(c), veh/h	225	472	417	97	0	275	101	465	458	219	576	563
V/C Ratio(X)	0.84	0.06	0.16	0.63	0.00	1.04	0.59	0.72	0.72	0.82	0.80	0.80
Avail Cap(c_a), veh/h	337	509	449	186	0	275	154	567	559	330	736	720
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	18.2	18.8	30.5	0.0	27.6	30.5	22.2	22.3	28.0	20.0	20.0
Incr Delay (d2), s/veh	11.2	0.0	0.2	6.6	0.0	64.2	5.3	3.4	3.6	9.2	5.1	5.2
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	3.5	0.3	0.8	1.1	0.0	9.0	1.0	4.6	4.6	3.1	6.5	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	18.3	18.9	37.1	0.0	91.8	35.8	25.6	25.8	37.2	25.1	25.2
LnGrp LOS	D	B	B	D	A	F	D	C	C	D	C	C
Approach Vol, veh/h		282			346			723			1095	
Approach Delay, s/veh		32.0			82.1			26.5			27.1	
Approach LOS		C			F			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.5	22.1	8.7	22.2	8.6	27.1	14.9	16.0				
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6				
Max Green Setting (Gmax), s	13.4	21.4	7.8	19.0	6.1	28.7	15.4	11.4				
Max Q Clear Time (g_c+I1), s	9.1	13.5	4.5	4.1	4.3	18.4	10.4	13.4				
Green Ext Time (p_c), s	0.2	2.4	0.0	0.2	0.0	4.0	0.2	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			35.3									
HCM 6th LOS			D									

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	413	352	1	165	437	1	12	363	10	498
v/c Ratio	0.70	0.33	0.00	0.27	0.69	0.01	0.06	0.80	0.02	0.62
Control Delay	33.7	10.3	0.0	28.7	9.2	47.0	37.4	45.3	26.5	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	10.3	0.0	28.7	9.2	47.0	37.4	45.3	26.5	6.7
Queue Length 50th (ft)	134	65	0	32	0	0	5	133	3	0
Queue Length 95th (ft)	#545	197	0	72	38	7	25	#532	19	40
Internal Link Dist (ft)		1856		434			916		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	717	1189	1060	1015	766	123	945	455	1293	1251
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	0.58	0.30	0.00	0.16	0.57	0.01	0.01	0.80	0.01	0.40

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)	355	303	1	0	134	354	1	10	0	294	8	403
Future Volume (veh/h)	355	303	1	0	134	354	1	10	0	294	8	403
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	413	352	1	0	165	344	1	12	0	363	10	405
Peak Hour Factor	0.86	0.86	0.86	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	463	1009	855	2	791	353	2	121	103	399	538	456
Arrive On Green	0.26	0.54	0.54	0.00	0.22	0.22	0.00	0.06	0.00	0.22	0.29	0.29
Sat Flow, veh/h	1781	1870	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	413	352	1	0	165	344	1	12	0	363	10	405
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	18.0	8.6	0.0	0.0	3.0	17.3	0.0	0.5	0.0	16.0	0.3	19.7
Cycle Q Clear(g_c), s	18.0	8.6	0.0	0.0	3.0	17.3	0.0	0.5	0.0	16.0	0.3	19.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	463	1009	855	2	791	353	2	121	103	399	538	456
V/C Ratio(X)	0.89	0.35	0.00	0.00	0.21	0.98	0.41	0.10	0.00	0.91	0.02	0.89
Avail Cap(c_a), veh/h	642	1009	855	111	791	353	111	844	715	407	1156	979
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	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	10.5	8.5	0.0	25.5	31.1	40.1	35.4	0.0	30.4	20.5	27.4
Incr Delay (d2), s/veh	11.5	0.2	0.0	0.0	0.1	41.2	83.6	0.4	0.0	23.7	0.0	6.0
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	8.7	3.2	0.0	0.0	1.2	10.3	0.1	0.2	0.0	9.0	0.1	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	10.7	8.5	0.0	25.6	72.2	123.7	35.7	0.0	54.1	20.5	33.4
LnGrp LOS	D	B	A	A	C	E	F	D	A	D	C	C
Approach Vol, veh/h		766			509			13			778	
Approach Delay, s/veh		26.6			57.1			42.5			42.9	
Approach LOS		C			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.6	9.8	0.0	48.0	4.7	27.7	25.5	22.5
Change Period (Y+Rc), s	4.6	4.6	4.5	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	18.4	36.3	5.0	42.0	5.0	49.7	29.0	17.9
Max Q Clear Time (g_c+I1), s	18.0	2.5	0.0	10.6	2.0	21.7	20.0	19.3
Green Ext Time (p_c), s	0.1	0.0	0.0	2.2	0.0	1.5	0.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	127.2
Intersection LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	489	184	55	316	239	110
Future Vol, veh/h	489	184	55	316	239	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	652	245	86	494	385	177
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	156.1	117.4	91.1
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	68%	0%	0%	15%
Vol Thru, %	0%	100%	0%	85%
Vol Right, %	32%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	349	489	184	371
LT Vol	239	0	0	55
Through Vol	0	489	0	316
RT Vol	110	0	184	0
Lane Flow Rate	563	652	245	580
Geometry Grp	2	7	7	5
Degree of Util (X)	1.078	1.382	0.472	1.153
Departure Headway (Hd)	7.547	8.2	7.474	7.776
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	484	450	486	470
Service Time	5.547	5.9	5.174	5.776
HCM Lane V/C Ratio	1.163	1.449	0.504	1.234
HCM Control Delay	91.1	208.6	16.7	117.4
HCM Lane LOS	F	F	C	F
HCM 95th-tile Q	16.4	28.8	2.5	19.3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	598	363	2	7	8
Future Vol, veh/h	2	598	363	2	7	8
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	75	75	64	64	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	797	567	3	8	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	570	0	-	0	1372	569
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	803	-
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	1002	-	-	-	161	522
Stage 1	-	-	-	-	566	-
Stage 2	-	-	-	-	441	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1002	-	-	-	160	522
Mov Cap-2 Maneuver	-	-	-	-	160	-
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	441	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1002	-	-	-	254
HCM Lane V/C Ratio	0.003	-	-	-	0.064
HCM Control Delay (s)	8.6	0	-	-	20.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	603	359	3	9	6
Future Vol, veh/h	2	603	359	3	9	6
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	56	56	55	55	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	1077	653	5	10	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	658	0	-	0	1741	656
Stage 1	-	-	-	-	656	-
Stage 2	-	-	-	-	1085	-
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	930	-	-	-	95	465
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	324	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	930	-	-	-	94	465
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	510	-
Stage 2	-	-	-	-	324	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	34.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	930	-	-	-	138
HCM Lane V/C Ratio	0.004	-	-	-	0.118
HCM Control Delay (s)	8.9	0	-	-	34.6
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Intersection Delay, s/veh	200.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	501	111	25	291	4	83	1	40	3	4	5
Future Vol, veh/h	1	501	111	25	291	4	83	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	895	198	45	529	7	117	1	56	5	7	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	317.7	41.8	14.9	12.2
HCM LOS	F	E	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	0%	8%	25%
Vol Thru, %	1%	82%	91%	33%
Vol Right, %	32%	18%	1%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	124	613	320	12
LT Vol	83	1	25	3
Through Vol	1	501	291	4
RT Vol	40	111	4	5
Lane Flow Rate	175	1095	582	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.333	1.658	0.897	0.042
Departure Headway (Hd)	7.997	5.453	6.343	8.83
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	452	679	576	408
Service Time	5.997	3.456	4.343	6.83
HCM Lane V/C Ratio	0.387	1.613	1.01	0.049
HCM Control Delay	14.9	317.7	41.8	12.2
HCM Lane LOS	B	F	E	B
HCM 95th-tile Q	1.4	61	10.6	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	3.3	0.4	1.9
Total Del/Veh (s)	13.7	53.8	31.7	39.8

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	105.4	8.9	0.7	39.4
Total Del/Veh (s)	334.0	42.6	32.1	131.9

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	89.7	0.8	4.7	0.6	14.0
Total Del/Veh (s)	185.3	22.7	78.9	31.9	66.1

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.4	0.0	0.1	0.0	0.5
Total Del/Veh (s)	37.5	14.4	36.0	44.3	33.2

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.1
Total Del/Veh (s)	10.6	12.4	8.9	10.9

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	3.2	0.2	5.9	1.7

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.8	2.8	9.3	1.9

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	8.6	10.5	5.5	4.4	9.2

Total Zone Performance

Denied Del/Veh (s)	36.6
Total Del/Veh (s)	1143.8

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	151	270	601	447
Average Queue (ft)	79	226	308	165
95th Queue (ft)	131	332	700	367
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			4	
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		66	0	
Queuing Penalty (veh)		161	0	

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	2614	105	474	481	169	382
Average Queue (ft)	1938	105	404	311	23	151
95th Queue (ft)	3292	106	550	567	126	329
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)	52		14	3		0
Queuing Penalty (veh)	0		84	19		0
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	4	96				15
Queuing Penalty (veh)	26	121				2

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	340	763	85	98	225	300	387	396	167	166	286	415
Average Queue (ft)	274	402	26	34	106	169	290	289	72	68	124	161
95th Queue (ft)	424	970	62	77	189	375	460	464	195	188	231	338
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		40				0	44	41	28	24		2
Queuing Penalty (veh)		0				0	187	177	80	68		23
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	52				0	0	51				1	9
Queuing Penalty (veh)	41				0	0	44				11	64

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	317
Average Queue (ft)	171
95th Queue (ft)	294
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	7
Queuing Penalty (veh)	40

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	T	T	R	L	T	L	T	R
Maximum Queue (ft)	269	748	131	99	131	183	30	98	241	49	170
Average Queue (ft)	186	182	8	52	47	75	5	40	221	11	68
95th Queue (ft)	285	760	141	82	86	139	23	80	268	35	129
Link Distance (ft)		1886	1886	436	436		1199	1199	223	223	223
Upstream Blk Time (%)		0							60		0
Queuing Penalty (veh)		0							162		0
Storage Bay Dist (ft)	180					250					
Storage Blk Time (%)	16	0				0					
Queuing Penalty (veh)	38	0				0					

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	206	123	174	131
Average Queue (ft)	92	55	82	57
95th Queue (ft)	158	94	139	98
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	50	30
Average Queue (ft)	5	7
95th Queue (ft)	28	28
Link Distance (ft)	708	597
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	34	31
Average Queue (ft)	2	8
95th Queue (ft)	16	30
Link Distance (ft)	304	584
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	136	110	60	31
Average Queue (ft)	65	60	34	11
95th Queue (ft)	107	90	55	35
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 1352

Intersection	
Intersection Delay, s/veh	92
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	292	1	5	630	243	0	0	139	275
Future Vol, veh/h	0	0	0	292	1	5	630	243	0	0	139	275
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.95	0.95	0.95	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	8	5	6	2	2	12	2
Mvmt Flow	0	0	0	365	1	6	663	256	0	0	167	331
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	27.8	147	38.5
HCM LOS	D	F	E

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	98%	0%
Vol Thru, %	0%	100%	0%	34%
Vol Right, %	0%	0%	2%	66%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	630	243	298	414
LT Vol	630	0	292	0
Through Vol	0	243	1	139
RT Vol	0	0	5	275
Lane Flow Rate	663	256	372	499
Geometry Grp	7	7	2	5
Degree of Util (X)	1.362	0.49	0.727	0.866
Departure Headway (Hd)	7.394	6.9	7.433	6.602
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	491	519	492	554
Service Time	5.166	4.672	5.433	4.602
HCM Lane V/C Ratio	1.35	0.493	0.756	0.901
HCM Control Delay	197.5	16.2	27.8	38.5
HCM Lane LOS	F	C	D	E
HCM 95th-tile Q	30	2.7	5.9	9.5

Intersection	
Intersection Delay, s/veh	192.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	1	652	0	0	0	0	749	447	15	410	0
Future Vol, veh/h	125	1	652	0	0	0	0	749	447	15	410	0
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.95	0.95	0.95	0.77	0.77	0.77
Heavy Vehicles, %	6	2	7	2	2	2	2	4	15	8	8	2
Mvmt Flow	129	1	672	0	0	0	0	788	471	19	532	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	156.7	236.9	143.8
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	749	447	126	652	15	410
LT Vol	0	0	125	0	15	0
Through Vol	749	0	1	0	0	410
RT Vol	0	447	0	652	0	0
Lane Flow Rate	788	471	130	672	19	532
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.692	0.943	0.302	1.328	0.047	1.221
Departure Headway (Hd)	8.828	8.29	8.902	7.591	9.782	9.26
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	418	442	407	484	368	399
Service Time	6.528	5.99	6.602	5.291	7.482	6.96
HCM Lane V/C Ratio	1.885	1.066	0.319	1.388	0.052	1.333
HCM Control Delay	343.2	58.8	15.4	184	13	148.6
HCM Lane LOS	F	F	C	F	B	F
HCM 95th-tile Q	41.5	10.9	1.3	27.9	0.1	19.8

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	286	18	78	43	282	100	913	198	885
v/c Ratio	0.91	0.03	0.13	0.35	0.65	0.66	0.88	0.89	0.71
Control Delay	67.6	21.9	0.7	48.8	14.1	62.1	40.4	76.9	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	21.9	0.7	48.8	14.1	62.1	40.4	76.9	27.5
Queue Length 50th (ft)	137	7	0	21	18	49	217	97	191
Queue Length 95th (ft)	#357	21	0	65	88	#155	#414	#300	#366
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	326	641	620	127	499	155	1065	223	1248
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	0.88	0.03	0.13	0.34	0.57	0.65	0.86	0.89	0.71

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)	243	15	66	40	10	255	87	702	92	194	700	168
Future Volume (veh/h)	243	15	66	40	10	255	87	702	92	194	700	168
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	1663	1870	1826	1663	1870	1856	1856	1870	1870	1737	1781	1856
Adj Flow Rate, veh/h	286	18	78	43	11	271	100	807	106	198	714	171
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	16	2	5	16	2	3	3	2	2	11	8	3
Cap, veh/h	318	591	489	72	10	246	127	891	117	226	939	225
Arrive On Green	0.20	0.32	0.32	0.05	0.16	0.16	0.07	0.28	0.28	0.14	0.35	0.35
Sat Flow, veh/h	1584	1870	1547	1584	62	1532	1767	3158	415	1654	2709	648
Grp Volume(v), veh/h	286	18	78	43	0	282	100	454	459	198	446	439
Grp Sat Flow(s),veh/h/ln	1584	1870	1547	1584	0	1595	1767	1777	1796	1654	1692	1665
Q Serve(g_s), s	14.7	0.6	3.0	2.2	0.0	13.4	4.7	20.6	20.6	9.8	19.5	19.5
Cycle Q Clear(g_c), s	14.7	0.6	3.0	2.2	0.0	13.4	4.7	20.6	20.6	9.8	19.5	19.5
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.23	1.00		0.39
Lane Grp Cap(c), veh/h	318	591	489	72	0	256	127	501	507	226	587	577
V/C Ratio(X)	0.90	0.03	0.16	0.60	0.00	1.10	0.79	0.91	0.91	0.88	0.76	0.76
Avail Cap(c_a), veh/h	330	591	489	129	0	256	157	519	525	226	587	577
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	19.7	20.6	39.1	0.0	35.1	38.1	28.9	28.9	35.4	24.2	24.2
Incr Delay (d2), s/veh	25.7	0.0	0.2	7.8	0.0	86.5	18.9	19.1	19.0	29.8	5.8	5.9
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	7.7	0.2	1.1	1.0	0.0	11.2	2.6	10.8	10.9	5.6	8.1	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	19.8	20.7	46.9	0.0	121.6	57.0	48.0	47.9	65.2	30.0	30.1
LnGrp LOS	E	B	C	D	A	F	E	D	D	E	C	C
Approach Vol, veh/h		382			325			1013			1083	
Approach Delay, s/veh		48.8			111.7			48.8			36.5	
Approach LOS		D			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	28.2	8.4	31.0	10.6	33.6	21.4	18.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	11.4	24.4	6.8	19.0	7.4	28.4	17.4	13.4
Max Q Clear Time (g_c+I1), s	11.8	22.6	4.2	5.0	6.7	21.5	16.7	15.4
Green Ext Time (p_c), s	0.0	1.0	0.0	0.2	0.0	3.0	0.1	0.0

Intersection Summary			
HCM 6th Ctrl Delay			51.3
HCM 6th LOS			D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	547	266	2	227	388	5	55	394	25	351
v/c Ratio	0.79	0.23	0.00	0.37	0.65	0.04	0.23	2.07	0.06	0.54
Control Delay	36.2	8.9	0.0	33.7	9.1	51.4	39.0	524.5	29.5	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	8.9	0.0	33.7	9.1	51.4	39.0	524.5	29.5	7.2
Queue Length 50th (ft)	219	52	0	55	0	2	26	~316	9	0
Queue Length 95th (ft)	#774	146	0	113	77	19	76	#829	41	78
Internal Link Dist (ft)		1856		434			1171		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	791	1212	1066	700	624	113	868	190	950	979
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	0.69	0.22	0.00	0.32	0.62	0.04	0.06	2.07	0.03	0.36

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	476	231	2	0	207	353	5	52	0	374	24	333
Future Volume (veh/h)	476	231	2	0	207	353	5	52	0	374	24	333
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	547	266	2	0	227	306	5	55	0	394	25	272
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	611	1095	928	3	623	278	12	169	144	218	389	330
Arrive On Green	0.34	0.59	0.59	0.00	0.18	0.18	0.01	0.09	0.00	0.12	0.21	0.21
Sat Flow, veh/h	1781	1870	1585	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	547	266	2	0	227	306	5	55	0	394	25	272
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	19.9	4.7	0.0	0.0	3.9	12.0	0.2	1.9	0.0	8.4	0.7	11.2
Cycle Q Clear(g_c), s	19.9	4.7	0.0	0.0	3.9	12.0	0.2	1.9	0.0	8.4	0.7	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	611	1095	928	3	623	278	12	169	144	218	389	330
V/C Ratio(X)	0.90	0.24	0.00	0.00	0.36	1.10	0.42	0.32	0.00	1.80	0.06	0.82
Avail Cap(c_a), veh/h	908	1147	972	130	623	278	130	994	842	218	1087	921
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	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	6.9	5.9	0.0	24.9	28.2	33.9	29.2	0.0	30.0	21.8	25.9
Incr Delay (d2), s/veh	8.1	0.1	0.0	0.0	0.4	84.1	22.3	1.1	0.0	379.2	0.1	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	1.5	0.0	0.0	1.6	10.7	0.2	0.9	0.0	26.3	0.3	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	7.0	5.9	0.0	25.2	112.3	56.2	30.3	0.0	409.3	21.8	31.1
LnGrp LOS	C	A	A	A	C	F	E	C	A	F	C	C
Approach Vol, veh/h		815			533			60			691	
Approach Delay, s/veh		22.1			75.2			32.4			246.4	
Approach LOS		C			E			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	10.8	0.0	44.7	5.0	18.9	28.1	16.6
Change Period (Y+Rc), s	4.6	* 4.6	4.5	4.6	4.5	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	* 36	5.0	42.0	5.0	39.8	34.9	12.0
Max Q Clear Time (g_c+I1), s	10.4	3.9	0.0	6.7	2.2	13.2	21.9	14.0
Green Ext Time (p_c), s	0.0	0.2	0.0	1.6	0.0	1.0	1.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	109.7
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	42.1
Intersection LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	437	287	75	415	220	60
Future Vol, veh/h	437	287	75	415	220	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	533	350	84	466	247	67
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	42.1	54.3	20.9
HCM LOS	E	F	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	79%	0%	0%	15%
Vol Thru, %	0%	100%	0%	85%
Vol Right, %	21%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	437	287	490
LT Vol	220	0	0	75
Through Vol	0	437	0	415
RT Vol	60	0	287	0
Lane Flow Rate	315	533	350	551
Geometry Grp	2	7	7	5
Degree of Util (X)	0.616	0.978	0.573	0.963
Departure Headway (Hd)	7.049	6.608	5.892	6.297
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	510	544	606	573
Service Time	5.129	4.407	3.691	4.377
HCM Lane V/C Ratio	0.618	0.98	0.578	0.962
HCM Control Delay	20.9	59	16.4	54.3
HCM Lane LOS	C	F	C	F
HCM 95th-tile Q	4.1	13.3	3.6	13

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	490	486	7	4	5
Future Vol, veh/h	8	490	486	7	4	5
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	82	82	89	89	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	598	546	8	4	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	554	0	-	0	1168	550
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	618	-
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	1016	-	-	-	214	535
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	538	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1016	-	-	-	211	535
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	538	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1016	-	-	-	318
HCM Lane V/C Ratio	0.01	-	-	-	0.031
HCM Control Delay (s)	8.6	0	-	-	16.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	487	489	8	5	4
Future Vol, veh/h	7	487	489	8	5	4
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	73	73	90	90	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	667	543	9	5	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	552	0	-	0	1235	548
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	687	-
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	1018	-	-	-	195	536
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	499	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1018	-	-	-	192	536
Mov Cap-2 Maneuver	-	-	-	-	192	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	499	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	18.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1018	-	-	-	269
HCM Lane V/C Ratio	0.009	-	-	-	0.036
HCM Control Delay (s)	8.6	0	-	-	18.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	37.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	6	433	73	20	432	8	70	2	20	7	1	5
Future Vol, veh/h	6	433	73	20	432	8	70	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	593	100	22	480	9	88	3	25	13	2	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	52.4	23.3	11.9	10.6
HCM LOS	F	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	76%	1%	4%	54%
Vol Thru, %	2%	85%	94%	8%
Vol Right, %	22%	14%	2%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	92	512	460	13
LT Vol	70	6	20	7
Through Vol	2	433	432	1
RT Vol	20	73	8	5
Lane Flow Rate	115	701	511	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.22	0.985	0.759	0.048
Departure Headway (Hd)	6.899	5.056	5.349	7.125
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	519	715	675	499
Service Time	4.971	3.097	3.396	5.218
HCM Lane V/C Ratio	0.222	0.98	0.757	0.048
HCM Control Delay	11.9	52.4	23.3	10.6
HCM Lane LOS	B	F	C	B
HCM 95th-tile Q	0.8	15.5	7	0.2

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.3	0.1
Total Del/Veh (s)	38.6	14.1	29.3	22.7

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.7	14.1	6.8	7.8
Total Del/Veh (s)	143.7	44.9	88.3	89.2

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.5	1.0	0.1	0.1	0.6
Total Del/Veh (s)	60.7	20.2	32.5	24.0	30.1

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.1	0.0	0.1	0.0	0.4
Total Del/Veh (s)	17.0	11.1	19.7	13.7	15.6

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	10.6	8.1	5.6	8.8

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.1	0.1
Total Del/Veh (s)	16.4	8.3	5.3	4.6	12.4

Total Zone Performance

Denied Del/Veh (s)	5.7
Total Del/Veh (s)	1143.6

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	390	182	129	363
Average Queue (ft)	140	94	64	115
95th Queue (ft)	401	159	104	322
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		2	0	
Queuing Penalty (veh)		7	0	

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	1705	105	472	475	236	622
Average Queue (ft)	961	104	363	225	17	345
95th Queue (ft)	2011	113	547	506	125	710
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)			10	2		3
Queuing Penalty (veh)			44	10		14
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	11	80				55
Queuing Penalty (veh)	54	184				3

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	314	380	63	112	235	189	307	314	15	5	224	423
Average Queue (ft)	165	71	25	42	93	43	143	136	1	0	95	111
95th Queue (ft)	327	334	51	91	181	131	271	263	13	4	178	285
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		0				0	2	1				0
Queuing Penalty (veh)		0				0	7	4				3
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	8				0		4				0	1
Queuing Penalty (veh)	6				0		2				1	3

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	334
Average Queue (ft)	197
95th Queue (ft)	317
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	9
Queuing Penalty (veh)	43

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	204	153	83	36	54	56	70	92	154	139	184	102
Average Queue (ft)	102	45	28	9	25	13	37	41	74	56	83	48
95th Queue (ft)	172	108	62	29	49	42	60	76	126	105	158	85
Link Distance (ft)		1873	1873	436	436	436		944	944	944	223	223
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)	180						250					
Storage Blk Time (%)	1	0										
Queuing Penalty (veh)	1	0										

Intersection: 4: B ST & WINTON PKWY

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	87	105
Average Queue (ft)	39	50
95th Queue (ft)	78	84
Link Distance (ft)	223	223
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	188	58	107	89
Average Queue (ft)	75	24	48	36
95th Queue (ft)	126	46	79	68
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	234	125	73	34
Average Queue (ft)	100	49	38	10
95th Queue (ft)	227	90	62	34
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	10			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 396

Intersection	
Intersection Delay, s/veh	60.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	315	0	10	470	365	0	0	134	140
Future Vol, veh/h	0	0	0	315	0	10	470	365	0	0	134	140
Peak Hour Factor	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.92	0.92	0.76	0.76
Heavy Vehicles, %	2	2	2	2	67	8	9	5	2	2	4	8
Mvmt Flow	0	0	0	463	0	15	540	420	0	0	176	184
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	45.5	82.2	22.2
HCM LOS	E	F	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	97%	0%
Vol Thru, %	0%	100%	0%	49%
Vol Right, %	0%	0%	3%	51%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	470	365	325	274
LT Vol	470	0	315	0
Through Vol	0	365	0	134
RT Vol	0	0	10	140
Lane Flow Rate	540	420	478	361
Geometry Grp	7	7	2	5
Degree of Util (X)	1.156	0.83	0.903	0.663
Departure Headway (Hd)	7.701	7.118	6.943	6.806
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	470	508	526	534
Service Time	5.455	4.872	4.943	4.806
HCM Lane V/C Ratio	1.149	0.827	0.909	0.676
HCM Control Delay	118.1	36	45.5	22.2
HCM Lane LOS	F	E	E	C
HCM 95th-tile Q	19.4	8.3	10.5	4.8

Intersection	
Intersection Delay, s/veh	158.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	230	0	491	0	0	0	0	604	288	5	450	0
Future Vol, veh/h	230	0	491	0	0	0	0	604	288	5	450	0
Peak Hour Factor	0.82	0.82	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.73	0.73	0.92
Heavy Vehicles, %	6	14	11	2	2	2	2	9	14	17	5	2
Mvmt Flow	280	0	599	0	0	0	0	657	313	7	616	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	101.7	164.7	228.5
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	100%	0%	100%	0%
Vol Thru, %	100%	0%	0%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	604	288	230	491	5	450
LT Vol	0	0	230	0	5	0
Through Vol	604	0	0	0	0	450
RT Vol	0	288	0	491	0	0
Lane Flow Rate	657	313	280	599	7	616
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.434	0.631	0.647	1.204	0.017	1.427
Departure Headway (Hd)	8.674	8.03	9.075	7.962	9.905	9.171
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	427	454	401	461	364	401
Service Time	6.374	5.73	6.775	5.662	7.605	6.871
HCM Lane V/C Ratio	1.539	0.689	0.698	1.299	0.019	1.536
HCM Control Delay	232	23.5	27	136.7	12.8	230.9
HCM Lane LOS	F	C	D	F	B	F
HCM 95th-tile Q	30	4.3	4.4	21.2	0.1	28.4

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	27	65	60	285	56	658	179	915
v/c Ratio	0.74	0.05	0.10	0.40	0.60	0.41	0.74	0.71	0.69
Control Delay	52.7	23.0	0.3	47.0	11.1	49.7	31.9	51.5	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	23.0	0.3	47.0	11.1	49.7	31.9	51.5	24.1
Queue Length 50th (ft)	81	10	0	27	10	25	138	78	184
Queue Length 95th (ft)	#268	31	0	#93	75	#92	262	#238	349
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	304	570	650	166	524	138	1058	295	1384
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	0.62	0.05	0.10	0.36	0.54	0.41	0.62	0.61	0.66

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)	172	25	59	56	20	245	49	466	106	154	622	165
Future Volume (veh/h)	172	25	59	56	20	245	49	466	106	154	622	165
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	1530	1781	1856	1663	1870	1870	1767	1856	1767	1722	1796	1737
Adj Flow Rate, veh/h	189	27	65	60	22	263	56	536	122	179	723	192
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.87	0.87	0.87	0.86	0.86	0.86
Percent Heavy Veh, %	25	8	3	16	2	2	9	3	9	12	7	11
Cap, veh/h	225	474	418	96	21	254	98	748	170	219	900	239
Arrive On Green	0.15	0.27	0.27	0.06	0.17	0.17	0.06	0.26	0.26	0.13	0.34	0.34
Sat Flow, veh/h	1457	1781	1572	1584	124	1480	1682	2855	647	1640	2667	708
Grp Volume(v), veh/h	189	27	65	60	0	285	56	330	328	179	463	452
Grp Sat Flow(s),veh/h/ln	1457	1781	1572	1584	0	1604	1682	1763	1739	1640	1706	1669
Q Serve(g_s), s	8.4	0.7	2.1	2.5	0.0	11.4	2.2	11.3	11.4	7.0	16.3	16.3
Cycle Q Clear(g_c), s	8.4	0.7	2.1	2.5	0.0	11.4	2.2	11.3	11.4	7.0	16.3	16.3
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.37	1.00		0.42
Lane Grp Cap(c), veh/h	225	474	418	96	0	276	98	462	456	219	576	563
V/C Ratio(X)	0.84	0.06	0.16	0.63	0.00	1.03	0.57	0.71	0.72	0.82	0.80	0.80
Avail Cap(c_a), veh/h	338	510	451	186	0	276	155	569	561	331	739	722
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	18.1	18.6	30.4	0.0	27.5	30.4	22.2	22.2	27.9	20.0	20.0
Incr Delay (d2), s/veh	11.1	0.0	0.2	6.5	0.0	63.2	5.2	3.3	3.4	9.1	5.0	5.1
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	3.5	0.3	0.7	1.1	0.0	9.0	1.0	4.6	4.6	3.1	6.4	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.3	18.2	18.8	37.0	0.0	90.6	35.6	25.5	25.7	37.0	24.9	25.1
LnGrp LOS	D	B	B	D	A	F	D	C	C	D	C	C
Approach Vol, veh/h		281			345			714			1094	
Approach Delay, s/veh		31.9			81.3			26.4			27.0	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	22.0	8.6	22.2	8.5	27.0	14.9	16.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	13.4	21.4	7.8	19.0	6.1	28.7	15.4	11.4
Max Q Clear Time (g_c+I1), s	9.0	13.4	4.5	4.1	4.2	18.3	10.4	13.4
Green Ext Time (p_c), s	0.2	2.4	0.0	0.2	0.0	4.1	0.2	0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	308	339	14	77	181	74	383	185	312	369
v/c Ratio	0.73	0.22	0.11	0.14	0.46	0.36	0.51	0.84	0.34	0.54
Control Delay	40.9	12.1	48.2	30.0	9.3	44.8	29.7	69.9	27.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	12.1	48.2	30.0	9.3	44.8	29.7	69.9	27.9	6.9
Queue Length 50th (ft)	105	34	5	14	0	26	68	70	55	0
Queue Length 95th (ft)	#356	100	33	41	37	107	170	#347	143	42
Internal Link Dist (ft)		1856		434			916		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	780	2255	130	1016	583	263	1892	219	1812	990
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	0.39	0.15	0.11	0.08	0.31	0.28	0.20	0.84	0.17	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)	265	223	69	11	62	147	60	298	12	150	253	299
Future Volume (veh/h)	265	223	69	11	62	147	60	298	12	150	253	299
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	308	259	80	14	77	88	74	368	15	185	312	276
Peak Hour Factor	0.86	0.86	0.86	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	384	845	255	31	406	181	112	627	25	248	911	406
Arrive On Green	0.22	0.31	0.31	0.02	0.11	0.11	0.06	0.18	0.18	0.14	0.26	0.26
Sat Flow, veh/h	1781	2689	812	1781	3554	1585	1781	3480	141	1781	3554	1585
Grp Volume(v), veh/h	308	169	170	14	77	88	74	187	196	185	312	276
Grp Sat Flow(s),veh/h/ln	1781	1777	1724	1781	1777	1585	1781	1777	1845	1781	1777	1585
Q Serve(g_s), s	8.6	3.8	3.9	0.4	1.0	2.7	2.1	5.1	5.1	5.2	3.8	8.2
Cycle Q Clear(g_c), s	8.6	3.8	3.9	0.4	1.0	2.7	2.1	5.1	5.1	5.2	3.8	8.2
Prop In Lane	1.00		0.47	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	384	559	542	31	406	181	112	320	332	248	911	406
V/C Ratio(X)	0.80	0.30	0.31	0.45	0.19	0.49	0.66	0.59	0.59	0.75	0.34	0.68
Avail Cap(c_a), veh/h	1015	1423	1380	170	1152	514	343	1230	1277	285	2344	1045
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	13.6	13.7	25.5	21.0	21.8	24.0	19.7	19.7	21.7	15.9	17.6
Incr Delay (d2), s/veh	3.9	0.3	0.3	9.7	0.2	2.0	6.5	1.7	1.7	8.9	0.2	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.3	1.3	0.2	0.4	1.0	1.0	2.1	2.1	2.5	1.3	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	13.9	14.0	35.2	21.3	23.8	30.5	21.4	21.4	30.6	16.1	19.6
LnGrp LOS	C	B	B	D	C	C	C	C	C	C	B	B
Approach Vol, veh/h		647			179			457			773	
Approach Delay, s/veh		18.5			23.6			22.9			20.8	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.9	14.0	5.4	21.1	7.9	18.0	15.9	10.6
Change Period (Y+Rc), s	4.6	4.6	4.5	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	36.3	5.0	42.0	10.1	34.6	29.9	17.0
Max Q Clear Time (g_c+I1), s	7.2	7.1	2.4	5.9	4.1	10.2	10.6	4.7
Green Ext Time (p_c), s	0.1	2.3	0.0	2.1	0.1	2.8	0.8	0.5

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	27.1
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱		↰↑	↰↱	
Traffic Vol, veh/h	401	47	55	218	60	110
Future Vol, veh/h	401	47	55	218	60	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	535	63	86	341	97	177
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	36.7	21.5	14.8
HCM LOS	E	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	35%	0%	0%	20%
Vol Thru, %	0%	100%	0%	80%
Vol Right, %	65%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	170	401	47	273
LT Vol	60	0	0	55
Through Vol	0	401	0	218
RT Vol	110	0	47	0
Lane Flow Rate	274	535	63	427
Geometry Grp	2	7	7	5
Degree of Util (X)	0.474	0.895	0.093	0.697
Departure Headway (Hd)	6.22	6.026	5.314	5.881
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	576	599	670	610
Service Time	4.3	3.791	3.079	3.952
HCM Lane V/C Ratio	0.476	0.893	0.094	0.7
HCM Control Delay	14.8	40	8.6	21.5
HCM Lane LOS	B	E	A	C
HCM 95th-tile Q	2.5	10.7	0.3	5.6

Intersection	
Intersection Delay, s/veh	101.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	1	429	82	25	224	4	59	1	40	3	4	5
Future Vol, veh/h	1	429	82	25	224	4	59	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	766	146	45	407	7	83	1	56	5	7	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	157.4	20.4	12.6	10.9
HCM LOS	F	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	59%	0%	10%	25%
Vol Thru, %	1%	84%	89%	33%
Vol Right, %	40%	16%	2%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	512	253	12
LT Vol	59	1	25	3
Through Vol	1	429	224	4
RT Vol	40	82	4	5
Lane Flow Rate	141	914	460	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.256	1.288	0.685	0.039
Departure Headway (Hd)	7.166	5.072	5.767	7.636
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	504	722	630	472
Service Time	5.166	3.074	3.767	5.636
HCM Lane V/C Ratio	0.28	1.266	0.73	0.042
HCM Control Delay	12.6	157.4	20.4	10.9
HCM Lane LOS	B	F	C	B
HCM 95th-tile Q	1	35.3	5.4	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	10.2	0.4	5.5
Total Del/Veh (s)	15.2	67.5	41.8	49.9

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	71.5	22.2	2.8	34.8
Total Del/Veh (s)	301.8	45.7	39.3	126.3

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	117.9	0.8	3.9	0.1	16.7
Total Del/Veh (s)	193.5	21.9	83.1	28.6	66.9

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.5	0.0	0.1	0.0	0.5
Total Del/Veh (s)	53.9	16.9	33.5	21.8	33.1

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.1	0.0
Total Del/Veh (s)	8.3	8.3	4.6	7.8

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	8.0	9.4	4.9	4.6	8.4

9: MAIN ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	0.3	0.3	0.3	0.5
Total Del/Veh (s)	20.8	11.2	15.4	4.5	14.8

Total Zone Performance

Denied Del/Veh (s)	27.2
Total Del/Veh (s)	1295.2

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	188	270	649	501
Average Queue (ft)	85	240	401	201
95th Queue (ft)	152	334	788	499
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)			1	
Queuing Penalty (veh)			10	
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		78		
Queuing Penalty (veh)		190		

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	2614	105	483	485	178	419
Average Queue (ft)	1806	105	410	331	28	181
95th Queue (ft)	3236	107	550	584	144	430
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)	41		16	4		0
Queuing Penalty (veh)	0		99	21		1
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	5	95				19
Queuing Penalty (veh)	32	120				3

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	340	744	81	134	262	300	391	401	164	172	275	372
Average Queue (ft)	272	419	26	37	100	166	300	299	82	76	123	132
95th Queue (ft)	433	975	62	93	204	375	464	472	203	199	227	303
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		42				0	48	46	31	27		0
Queuing Penalty (veh)		0				0	206	199	88	78		4
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	56				1	0	54				1	1
Queuing Penalty (veh)	44				0	0	46				11	6

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	324
Average Queue (ft)	202
95th Queue (ft)	317
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	11
Queuing Penalty (veh)	58

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	268	761	654	39	79	69	147	124	194	182	224	110
Average Queue (ft)	189	215	159	10	38	29	53	56	92	78	111	57
95th Queue (ft)	295	864	747	31	66	61	110	102	175	162	207	97
Link Distance (ft)		1873	1873	436	436	436		1199	1199	1199	223	223
Upstream Blk Time (%)		1	0								4	
Queuing Penalty (veh)		0	0								10	
Storage Bay Dist (ft)	180						250					
Storage Blk Time (%)	24	0					0					
Queuing Penalty (veh)	15	0					0					

Intersection: 4: B ST & WINTON PKWY

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	103	111
Average Queue (ft)	47	55
95th Queue (ft)	86	95
Link Distance (ft)	223	223
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	111	64	90	59
Average Queue (ft)	61	30	53	29
95th Queue (ft)	94	50	79	49
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	121	100	60	37
Average Queue (ft)	58	53	30	10
95th Queue (ft)	95	79	53	34
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: MAIN ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	414	197	261	83
Average Queue (ft)	156	71	94	34
95th Queue (ft)	361	139	206	72
Link Distance (ft)	922	810	1297	1094
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 1241

Intersection	
Intersection Delay, s/veh	90.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	292	1	5	626	243	0	0	139	275
Future Vol, veh/h	0	0	0	292	1	5	626	243	0	0	139	275
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.95	0.95	0.95	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	8	5	6	2	2	12	2
Mvmt Flow	0	0	0	365	1	6	659	256	0	0	167	331
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	27.8	144.1	38.4
HCM LOS	D	F	E

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	98%	0%
Vol Thru, %	0%	100%	0%	34%
Vol Right, %	0%	0%	2%	66%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	626	243	298	414
LT Vol	626	0	292	0
Through Vol	0	243	1	139
RT Vol	0	0	5	275
Lane Flow Rate	659	256	372	499
Geometry Grp	7	7	2	5
Degree of Util (X)	1.353	0.49	0.727	0.866
Departure Headway (Hd)	7.394	6.9	7.427	6.597
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	494	519	492	554
Service Time	5.166	4.672	5.427	4.597
HCM Lane V/C Ratio	1.334	0.493	0.756	0.901
HCM Control Delay	193.8	16.2	27.8	38.4
HCM Lane LOS	F	C	D	E
HCM 95th-tile Q	29.6	2.7	5.9	9.5

Intersection	
Intersection Delay, s/veh	189.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	1	646	0	0	0	0	745	447	15	410	0
Future Vol, veh/h	125	1	646	0	0	0	0	745	447	15	410	0
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.95	0.95	0.95	0.77	0.77	0.77
Heavy Vehicles, %	6	2	7	2	2	2	2	4	15	8	8	2
Mvmt Flow	129	1	666	0	0	0	0	784	471	19	532	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	152.4	234	143.8
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	745	447	126	646	15	410
LT Vol	0	0	125	0	15	0
Through Vol	745	0	1	0	0	410
RT Vol	0	447	0	646	0	0
Lane Flow Rate	784	471	130	666	19	532
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.683	0.943	0.302	1.316	0.047	1.221
Departure Headway (Hd)	8.803	8.265	8.9	7.59	9.762	9.24
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	423	442	407	486	369	399
Service Time	6.503	5.965	6.6	5.29	7.462	6.94
HCM Lane V/C Ratio	1.853	1.066	0.319	1.37	0.051	1.333
HCM Control Delay	339.2	58.7	15.4	179.1	12.9	148.6
HCM Lane LOS	F	F	C	F	B	F
HCM 95th-tile Q	41.2	11	1.3	27.3	0.1	19.8

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	286	18	75	41	282	99	908	198	879
v/c Ratio	0.91	0.03	0.13	0.34	0.65	0.66	0.88	0.89	0.70
Control Delay	67.5	21.9	0.5	48.3	14.1	61.5	40.2	76.8	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.5	21.9	0.5	48.3	14.1	61.5	40.2	76.8	27.4
Queue Length 50th (ft)	137	7	0	20	18	48	216	97	188
Queue Length 95th (ft)	#357	21	0	64	88	#153	#410	#300	361
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	326	641	620	127	500	156	1064	223	1247
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	0.88	0.03	0.12	0.32	0.56	0.63	0.85	0.89	0.70

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)	243	15	64	39	10	255	86	698	92	194	694	168
Future Volume (veh/h)	243	15	64	39	10	255	86	698	92	194	694	168
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	1663	1870	1826	1663	1870	1856	1856	1870	1870	1737	1781	1856
Adj Flow Rate, veh/h	286	18	75	41	11	271	99	802	106	198	708	171
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	16	2	5	16	2	3	3	2	2	11	8	3
Cap, veh/h	318	593	491	70	10	246	126	888	117	226	938	226
Arrive On Green	0.20	0.32	0.32	0.04	0.16	0.16	0.07	0.28	0.28	0.14	0.35	0.35
Sat Flow, veh/h	1584	1870	1547	1584	62	1532	1767	3155	417	1654	2704	653
Grp Volume(v), veh/h	286	18	75	41	0	282	99	452	456	198	443	436
Grp Sat Flow(s),veh/h/ln	1584	1870	1547	1584	0	1595	1767	1777	1795	1654	1692	1664
Q Serve(g_s), s	14.7	0.6	2.9	2.1	0.0	13.4	4.6	20.4	20.4	9.8	19.3	19.3
Cycle Q Clear(g_c), s	14.7	0.6	2.9	2.1	0.0	13.4	4.6	20.4	20.4	9.8	19.3	19.3
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.23	1.00		0.39
Lane Grp Cap(c), veh/h	318	593	491	70	0	256	126	500	505	226	587	577
V/C Ratio(X)	0.90	0.03	0.15	0.59	0.00	1.10	0.79	0.90	0.90	0.88	0.75	0.76
Avail Cap(c_a), veh/h	330	593	491	129	0	256	157	520	525	226	587	577
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.5	19.6	20.4	39.1	0.0	35.0	38.1	28.9	28.9	35.3	24.1	24.1
Incr Delay (d2), s/veh	25.6	0.0	0.1	7.6	0.0	86.0	18.6	18.6	18.5	29.6	5.5	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	0.2	1.0	1.0	0.0	11.2	2.6	10.6	10.7	5.6	8.0	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	19.7	20.6	46.7	0.0	121.0	56.7	47.5	47.4	64.9	29.6	29.8
LnGrp LOS	E	B	C	D	A	F	E	D	D	E	C	C
Approach Vol, veh/h		379			323			1007			1077	
Approach Delay, s/veh		48.9			111.6			48.4			36.2	
Approach LOS		D			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	28.1	8.3	31.1	10.5	33.5	21.3	18.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	11.4	24.4	6.8	19.0	7.4	28.4	17.4	13.4
Max Q Clear Time (g_c+I1), s	11.8	22.4	4.1	4.9	6.6	21.3	16.7	15.4
Green Ext Time (p_c), s	0.0	1.1	0.0	0.2	0.0	3.0	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	51.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	455	255	12	130	210	88	315	172	277	313
v/c Ratio	0.83	0.15	0.10	0.25	0.51	0.44	0.46	0.89	0.34	0.52
Control Delay	44.6	7.5	53.0	34.4	9.7	50.2	32.9	84.8	32.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	7.5	53.0	34.4	9.7	50.2	32.9	84.8	32.9	7.8
Queue Length 50th (ft)	183	16	5	29	0	38	67	80	61	0
Queue Length 95th (ft)	#651	58	34	73	60	140	164	#385	153	76
Internal Link Dist (ft)		1856		434			1171		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	778	2011	115	746	499	276	1682	193	1525	860
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	0.58	0.13	0.10	0.17	0.42	0.32	0.19	0.89	0.18	0.36

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)	396	127	95	11	118	191	84	288	11	163	263	297
Future Volume (veh/h)	396	127	95	11	118	191	84	288	11	163	263	297
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	455	146	109	12	130	128	88	303	12	172	277	234
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	529	808	564	27	429	191	115	511	20	227	751	335
Arrive On Green	0.30	0.40	0.40	0.02	0.12	0.12	0.06	0.15	0.15	0.13	0.21	0.21
Sat Flow, veh/h	1781	2000	1396	1781	3554	1585	1781	3485	138	1781	3554	1585
Grp Volume(v), veh/h	455	129	126	12	130	128	88	154	161	172	277	234
Grp Sat Flow(s),veh/h/ln	1781	1777	1619	1781	1777	1585	1781	1777	1846	1781	1777	1585
Q Serve(g_s), s	14.4	2.8	3.0	0.4	2.0	4.6	2.9	4.8	4.9	5.6	4.0	8.2
Cycle Q Clear(g_c), s	14.4	2.8	3.0	0.4	2.0	4.6	2.9	4.8	4.9	5.6	4.0	8.2
Prop In Lane	1.00		0.86	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	529	718	654	27	429	191	115	261	271	227	751	335
V/C Ratio(X)	0.86	0.18	0.19	0.45	0.30	0.67	0.77	0.59	0.59	0.76	0.37	0.70
Avail Cap(c_a), veh/h	1009	1250	1139	149	780	348	358	1084	1126	251	1953	871
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	19.8	11.4	11.5	29.1	23.9	25.1	27.5	23.8	23.8	25.1	20.1	21.8
Incr Delay (d2), s/veh	4.2	0.1	0.1	11.1	0.4	4.0	10.3	2.1	2.1	11.4	0.3	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	1.0	1.0	0.2	0.8	1.8	1.5	2.1	2.1	2.8	1.5	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	11.5	11.6	40.3	24.3	29.1	37.7	25.9	25.9	36.6	20.4	24.4
LnGrp LOS	C	B	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		710			270			403			683	
Approach Delay, s/veh		19.6			27.3			28.5			25.9	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	13.4	5.4	28.7	8.3	17.2	22.3	11.8
Change Period (Y+Rc), s	4.6	* 4.6	4.5	4.6	4.5	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	* 36	5.0	42.0	12.0	32.8	33.8	13.1
Max Q Clear Time (g_c+I1), s	7.6	6.9	2.4	5.0	4.9	10.2	16.4	6.6
Green Ext Time (p_c), s	0.0	1.9	0.0	1.6	0.1	2.4	1.3	0.6

Intersection Summary	
HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	303	70	75	323	54	60
Future Vol, veh/h	303	70	75	323	54	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	370	85	84	363	61	67
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	13	15.7	10.3
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	47%	0%	0%	19%
Vol Thru, %	0%	100%	0%	81%
Vol Right, %	53%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	114	303	70	398
LT Vol	54	0	0	75
Through Vol	0	303	0	323
RT Vol	60	0	70	0
Lane Flow Rate	128	370	85	447
Geometry Grp	2	7	7	5
Degree of Util (X)	0.207	0.542	0.108	0.614
Departure Headway (Hd)	5.805	5.281	4.575	4.942
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	623	676	773	724
Service Time	3.805	3.068	2.361	3.024
HCM Lane V/C Ratio	0.205	0.547	0.11	0.617
HCM Control Delay	10.3	14.2	7.9	15.7
HCM Lane LOS	B	B	A	C
HCM 95th-tile Q	0.8	3.3	0.4	4.2

Intersection	
Intersection Delay, s/veh	15.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	6	334	45	20	360	8	44	2	20	7	1	5
Future Vol, veh/h	6	334	45	20	360	8	44	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	458	62	22	400	9	55	3	25	13	2	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17.4	14.4	10.2	9.5
HCM LOS	C	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	2%	5%	54%
Vol Thru, %	3%	87%	93%	8%
Vol Right, %	30%	12%	2%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	66	385	388	13
LT Vol	44	6	20	7
Through Vol	2	334	360	1
RT Vol	20	45	8	5
Lane Flow Rate	82	527	431	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.141	0.684	0.578	0.042
Departure Headway (Hd)	6.158	4.671	4.827	6.253
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	586	765	737	576
Service Time	4.16	2.752	2.915	4.258
HCM Lane V/C Ratio	0.14	0.689	0.585	0.042
HCM Control Delay	10.2	17.4	14.4	9.5
HCM Lane LOS	B	C	B	A
HCM 95th-tile Q	0.5	5.5	3.7	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.1	0.3	0.1
Total Del/Veh (s)	33.8	15.6	19.1	20.5

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	1.1	12.1	9.4	7.7
Total Del/Veh (s)	139.4	45.4	85.1	87.1

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	41.6	1.0	0.9	0.1	5.4
Total Del/Veh (s)	115.7	20.6	44.1	23.7	39.6

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.1	0.0	0.1	0.0	0.3
Total Del/Veh (s)	15.7	11.6	20.2	13.6	15.3

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	10.6	8.4	5.8	9.0

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0
Total Del/Veh (s)	3.3	0.1	8.6	2.3

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	10.6	0.0	0.1	7.0
Total Del/Veh (s)	8.2	2.6	47.0	7.0

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.9	0.0	0.1	0.1	0.5
Total Del/Veh (s)	17.2	8.2	5.6	4.9	13.0

Total Zone Performance

Denied Del/Veh (s)	10.4
Total Del/Veh (s)	897.0

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	424	232	149	267
Average Queue (ft)	132	107	67	89
95th Queue (ft)	319	198	145	196
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		6		
Queuing Penalty (veh)		25		

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	1725	105	474	478	272	646
Average Queue (ft)	923	104	360	226	24	333
95th Queue (ft)	2074	112	540	526	149	687
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)	3		13	3		3
Queuing Penalty (veh)	0		58	15		12
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	12	77				53
Queuing Penalty (veh)	58	177				3

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	324	575	80	110	232	250	319	336	71	58	233	346
Average Queue (ft)	187	193	27	42	101	60	168	162	7	5	91	101
95th Queue (ft)	372	668	62	89	192	190	332	330	55	45	172	257
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		13				0	8	5	2	0		0
Queuing Penalty (veh)		0				0	23	15	4	1		3
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	26		0		0	0	13				0	0
Queuing Penalty (veh)	21		0		0	0	6				4	3

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	316
Average Queue (ft)	195
95th Queue (ft)	304
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	8
Queuing Penalty (veh)	38

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	207	133	80	32	51	48	73	97	152	140	171	101
Average Queue (ft)	104	45	27	7	25	14	39	39	73	57	84	46
95th Queue (ft)	176	95	58	26	44	40	62	80	128	111	146	84
Link Distance (ft)		1873	1873	436	436	436		944	944	944	223	223
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180						250					
Storage Blk Time (%)	1	0										
Queuing Penalty (veh)	1	0										

Intersection: 4: B ST & WINTON PKWY

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	94	123
Average Queue (ft)	37	54
95th Queue (ft)	78	97
Link Distance (ft)	223	223
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	169	56	101	88
Average Queue (ft)	77	24	48	38
95th Queue (ft)	130	48	80	70
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	20	32
Average Queue (ft)	1	11
95th Queue (ft)	12	34
Link Distance (ft)	708	597
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	235	60
Average Queue (ft)	48	15
95th Queue (ft)	200	46
Link Distance (ft)	304	584
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	234	119	74	31
Average Queue (ft)	107	50	38	10
95th Queue (ft)	235	89	61	33
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	13			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 481

Intersection	
Intersection Delay, s/veh	61.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	315	0	10	475	365	0	0	134	140
Future Vol, veh/h	0	0	0	315	0	10	475	365	0	0	134	140
Peak Hour Factor	0.92	0.92	0.92	0.68	0.68	0.68	0.87	0.87	0.92	0.92	0.76	0.76
Heavy Vehicles, %	2	2	2	2	67	8	9	5	2	2	4	8
Mvmt Flow	0	0	0	463	0	15	546	420	0	0	176	184
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	43.5	84.8	22.1
HCM LOS	E	F	C

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	97%	0%
Vol Thru, %	0%	100%	0%	49%
Vol Right, %	0%	0%	3%	51%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	475	365	325	274
LT Vol	475	0	315	0
Through Vol	0	365	0	134
RT Vol	0	0	10	140
Lane Flow Rate	546	420	478	361
Geometry Grp	7	7	2	5
Degree of Util (X)	1.168	0.83	0.89	0.663
Departure Headway (Hd)	7.703	7.12	6.946	6.776
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	475	512	526	537
Service Time	5.422	4.839	4.946	4.776
HCM Lane V/C Ratio	1.149	0.82	0.909	0.672
HCM Control Delay	122.3	35.9	43.5	22.1
HCM Lane LOS	F	E	E	C
HCM 95th-tile Q	20	8.3	10.1	4.9

Intersection	
Intersection Delay, s/veh	160.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	230	0	492	0	0	0	0	609	288	5	450	0
Future Vol, veh/h	230	0	492	0	0	0	0	609	288	5	450	0
Peak Hour Factor	0.82	0.82	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.73	0.73	0.92
Heavy Vehicles, %	6	14	11	2	2	2	2	9	14	17	5	2
Mvmt Flow	280	0	600	0	0	0	0	662	313	7	616	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	102.5	168.5	228.6
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	100%	0%	100%	0%
Vol Thru, %	100%	0%	0%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	609	288	230	492	5	450
LT Vol	0	0	230	0	5	0
Through Vol	609	0	0	0	0	450
RT Vol	0	288	0	492	0	0
Lane Flow Rate	662	313	280	600	7	616
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.446	0.631	0.647	1.207	0.017	1.427
Departure Headway (Hd)	8.677	8.033	9.079	7.967	9.92	9.186
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	424	454	401	462	363	401
Service Time	6.377	5.733	6.779	5.667	7.62	6.886
HCM Lane V/C Ratio	1.561	0.689	0.698	1.299	0.019	1.536
HCM Control Delay	237.1	23.5	27	137.8	12.8	231
HCM Lane LOS	F	C	D	F	B	F
HCM 95th-tile Q	30.5	4.3	4.4	21.3	0.1	28.3

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	27	66	61	285	59	664	179	916
v/c Ratio	0.74	0.05	0.10	0.40	0.60	0.43	0.75	0.71	0.69
Control Delay	52.6	23.0	0.3	47.3	11.1	50.7	32.2	51.4	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	23.0	0.3	47.3	11.1	50.7	32.2	51.4	24.2
Queue Length 50th (ft)	81	10	0	27	10	27	140	78	184
Queue Length 95th (ft)	#268	31	0	#96	75	#100	265	#238	350
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	304	570	650	166	524	138	1056	295	1384
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	0.62	0.05	0.10	0.37	0.54	0.43	0.63	0.61	0.66

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)	172	25	60	57	20	245	51	471	107	154	623	165
Future Volume (veh/h)	172	25	60	57	20	245	51	471	107	154	623	165
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	1530	1781	1856	1663	1870	1870	1767	1856	1767	1722	1796	1737
Adj Flow Rate, veh/h	189	27	66	61	22	263	59	541	123	179	724	192
Peak Hour Factor	0.91	0.91	0.91	0.93	0.93	0.93	0.87	0.87	0.87	0.86	0.86	0.86
Percent Heavy Veh, %	25	8	3	16	2	2	9	3	9	12	7	11
Cap, veh/h	225	472	417	97	21	254	101	753	170	219	900	239
Arrive On Green	0.15	0.27	0.27	0.06	0.17	0.17	0.06	0.26	0.26	0.13	0.34	0.34
Sat Flow, veh/h	1457	1781	1572	1584	124	1480	1682	2855	647	1640	2668	707
Grp Volume(v), veh/h	189	27	66	61	0	285	59	333	331	179	463	453
Grp Sat Flow(s),veh/h/ln	1457	1781	1572	1584	0	1604	1682	1763	1739	1640	1706	1669
Q Serve(g_s), s	8.4	0.8	2.1	2.5	0.0	11.4	2.3	11.4	11.5	7.1	16.4	16.4
Cycle Q Clear(g_c), s	8.4	0.8	2.1	2.5	0.0	11.4	2.3	11.4	11.5	7.1	16.4	16.4
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.37	1.00		0.42
Lane Grp Cap(c), veh/h	225	472	417	97	0	275	101	465	458	219	576	563
V/C Ratio(X)	0.84	0.06	0.16	0.63	0.00	1.04	0.59	0.72	0.72	0.82	0.80	0.80
Avail Cap(c_a), veh/h	337	509	449	186	0	275	154	567	559	330	736	720
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	18.2	18.8	30.5	0.0	27.6	30.5	22.2	22.3	28.0	20.0	20.0
Incr Delay (d2), s/veh	11.2	0.0	0.2	6.6	0.0	64.2	5.3	3.4	3.6	9.2	5.1	5.2
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	3.5	0.3	0.8	1.1	0.0	9.0	1.0	4.6	4.6	3.1	6.5	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	18.3	18.9	37.1	0.0	91.8	35.8	25.6	25.8	37.2	25.1	25.2
LnGrp LOS	D	B	B	D	A	F	D	C	C	D	C	C
Approach Vol, veh/h		282			346			723			1095	
Approach Delay, s/veh		32.0			82.1			26.5			27.1	
Approach LOS		C			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	22.1	8.7	22.2	8.6	27.1	14.9	16.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	13.4	21.4	7.8	19.0	6.1	28.7	15.4	11.4
Max Q Clear Time (g_c+I1), s	9.1	13.5	4.5	4.1	4.3	18.4	10.4	13.4
Green Ext Time (p_c), s	0.2	2.4	0.0	0.2	0.0	4.0	0.2	0.0

Intersection Summary	
HCM 6th Ctrl Delay	35.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	308	340	14	80	191	74	383	195	312	369
v/c Ratio	0.73	0.22	0.11	0.15	0.48	0.36	0.51	0.89	0.34	0.54
Control Delay	40.9	12.1	48.2	30.0	9.3	44.8	29.7	77.0	27.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	12.1	48.2	30.0	9.3	44.8	29.7	77.0	27.9	6.9
Queue Length 50th (ft)	105	34	5	14	0	26	68	74	55	0
Queue Length 95th (ft)	#356	100	33	42	37	107	170	#367	143	42
Internal Link Dist (ft)		1856		434			916		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	780	2254	130	1016	590	263	1891	219	1812	990
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	0.39	0.15	0.11	0.08	0.32	0.28	0.20	0.89	0.17	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)	265	224	69	11	65	155	60	298	12	158	253	299
Future Volume (veh/h)	265	224	69	11	65	155	60	298	12	158	253	299
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	308	260	80	14	80	98	74	368	15	195	312	276
Peak Hour Factor	0.86	0.86	0.86	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	384	843	254	31	403	180	112	625	25	256	926	413
Arrive On Green	0.22	0.31	0.31	0.02	0.11	0.11	0.06	0.18	0.18	0.14	0.26	0.26
Sat Flow, veh/h	1781	2691	810	1781	3554	1585	1781	3480	141	1781	3554	1585
Grp Volume(v), veh/h	308	170	170	14	80	98	74	187	196	195	312	276
Grp Sat Flow(s),veh/h/ln	1781	1777	1725	1781	1777	1585	1781	1777	1845	1781	1777	1585
Q Serve(g_s), s	8.7	3.8	4.0	0.4	1.1	3.1	2.1	5.1	5.1	5.6	3.8	8.2
Cycle Q Clear(g_c), s	8.7	3.8	4.0	0.4	1.1	3.1	2.1	5.1	5.1	5.6	3.8	8.2
Prop In Lane	1.00		0.47	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	384	556	540	31	403	180	112	319	331	256	926	413
V/C Ratio(X)	0.80	0.30	0.32	0.45	0.20	0.55	0.66	0.59	0.59	0.76	0.34	0.67
Avail Cap(c_a), veh/h	1007	1411	1369	168	1142	509	340	1219	1266	283	2324	1037
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	19.7	13.8	13.8	25.7	21.3	22.2	24.3	19.9	19.9	21.8	15.8	17.5
Incr Delay (d2), s/veh	3.9	0.3	0.3	9.7	0.2	2.6	6.6	1.7	1.7	10.5	0.2	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	1.4	1.4	0.2	0.4	1.2	1.0	2.1	2.2	2.8	1.3	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	14.1	14.2	35.4	21.5	24.7	30.8	21.6	21.6	32.2	16.1	19.4
LnGrp LOS	C	B	B	D	C	C	C	C	C	C	B	B
Approach Vol, veh/h		648			192			457			783	
Approach Delay, s/veh		18.6			24.2			23.1			21.3	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	14.1	5.4	21.2	7.9	18.4	16.0	10.6
Change Period (Y+Rc), s	4.6	4.6	4.5	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	36.3	5.0	42.0	10.1	34.6	29.9	17.0
Max Q Clear Time (g_c+I1), s	7.6	7.1	2.4	6.0	4.1	10.2	10.7	5.1
Green Ext Time (p_c), s	0.0	2.3	0.0	2.1	0.1	2.8	0.8	0.5

Intersection Summary	
HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	29
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	405	47	55	232	60	110
Future Vol, veh/h	405	47	55	232	60	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	540	63	86	363	97	177
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	39.2	23.7	15.1
HCM LOS	E	C	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	35%	0%	0%	19%
Vol Thru, %	0%	100%	0%	81%
Vol Right, %	65%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	170	405	47	287
LT Vol	60	0	0	55
Through Vol	0	405	0	232
RT Vol	110	0	47	0
Lane Flow Rate	274	540	63	448
Geometry Grp	2	7	7	5
Degree of Util (X)	0.479	0.91	0.093	0.735
Departure Headway (Hd)	6.289	6.069	5.358	5.904
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	570	594	664	610
Service Time	4.371	3.837	3.125	3.976
HCM Lane V/C Ratio	0.481	0.909	0.095	0.734
HCM Control Delay	15.1	42.7	8.7	23.7
HCM Lane LOS	C	E	A	C
HCM 95th-tile Q	2.6	11.2	0.3	6.3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	513	279	2	7	8
Future Vol, veh/h	2	513	279	2	7	8
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	75	75	64	64	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	684	436	3	8	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	439	0	-	0	1128	438
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	690	-
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	1121	-	-	-	226	619
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	498	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1121	-	-	-	225	619
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	648	-
Stage 2	-	-	-	-	498	-

Approach	EB		WB		SB	
HCM Control Delay, s	0		0		16.1	
HCM LOS					C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1121	-	-	-	341
HCM Lane V/C Ratio	0.002	-	-	-	0.048
HCM Control Delay (s)	8.2	0	-	-	16.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	518	275	3	9	6
Future Vol, veh/h	2	518	275	3	9	6
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	56	56	55	55	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	925	500	5	10	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	505	0	-	0	1436	503
Stage 1	-	-	-	-	503	-
Stage 2	-	-	-	-	933	-
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	1060	-	-	-	147	569
Stage 1	-	-	-	-	607	-
Stage 2	-	-	-	-	383	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1060	-	-	-	146	569
Mov Cap-2 Maneuver	-	-	-	-	146	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	23.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1060	-	-	-	208
HCM Lane V/C Ratio	0.003	-	-	-	0.078
HCM Control Delay (s)	8.4	0	-	-	23.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Intersection Delay, s/veh	113.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	444	83	25	228	4	60	1	40	3	4	5
Future Vol, veh/h	1	444	83	25	228	4	60	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	793	148	45	415	7	85	1	56	5	7	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	176.5	21.1	12.8	11.1
HCM LOS	F	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	59%	0%	10%	25%
Vol Thru, %	1%	84%	89%	33%
Vol Right, %	40%	16%	2%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	528	257	12
LT Vol	60	1	25	3
Through Vol	1	444	228	4
RT Vol	40	83	4	5
Lane Flow Rate	142	943	467	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.259	1.334	0.697	0.039
Departure Headway (Hd)	7.253	5.092	5.819	7.743
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	498	717	626	465
Service Time	5.253	3.094	3.819	5.743
HCM Lane V/C Ratio	0.285	1.315	0.746	0.043
HCM Control Delay	12.8	176.5	21.1	11.1
HCM Lane LOS	B	F	C	B
HCM 95th-tile Q	1	38.7	5.6	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	4.1	0.4	2.3
Total Del/Veh (s)	15.1	56.3	30.5	40.8

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	65.3	12.4	1.1	27.6
Total Del/Veh (s)	326.5	46.0	41.9	134.8

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	162.4	0.8	4.6	0.1	23.0
Total Del/Veh (s)	209.2	22.3	84.6	29.5	69.1

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	4.9	0.0	0.1	0.0	1.5
Total Del/Veh (s)	76.8	17.0	30.8	19.4	38.4

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.1	0.0
Total Del/Veh (s)	8.3	8.4	4.6	7.9

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	2.9	0.2	5.2	1.5

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.7	2.8	7.9	1.8

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	7.9	9.7	4.9	4.6	8.5

9: MAIN ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.3	0.3	0.3	0.3
Total Del/Veh (s)	19.3	12.1	21.0	4.6	15.7

Total Zone Performance

Denied Del/Veh (s)	26.3
Total Del/Veh (s)	1235.3

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB
Directions Served	LTR	L	T	TR
Maximum Queue (ft)	211	270	637	407
Average Queue (ft)	85	225	320	167
95th Queue (ft)	154	334	719	352
Link Distance (ft)	2081		644	1053
Upstream Blk Time (%)			1	
Queuing Penalty (veh)			10	
Storage Bay Dist (ft)		180		
Storage Blk Time (%)		66	0	
Queuing Penalty (veh)		161	0	

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	2617	105	472	489	240	468
Average Queue (ft)	1925	105	420	323	24	190
95th Queue (ft)	3267	105	529	585	131	426
Link Distance (ft)	2557		430	430		644
Upstream Blk Time (%)	46		16	4		0
Queuing Penalty (veh)	0		97	23		0
Storage Bay Dist (ft)		80			215	
Storage Blk Time (%)	4	97				26
Queuing Penalty (veh)	29	123				4

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	340	763	82	126	256	300	393	402	161	164	257	414
Average Queue (ft)	276	454	26	38	103	165	294	291	81	79	116	146
95th Queue (ft)	434	1006	62	94	195	374	467	475	201	200	210	325
Link Distance (ft)		705			722		300	300	103	103		430
Upstream Blk Time (%)		46				0	50	47	35	29		1
Queuing Penalty (veh)		0				0	220	208	101	86		6
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	59				0	0	55				2	1
Queuing Penalty (veh)	47				0	0	48				14	6

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	334
Average Queue (ft)	212
95th Queue (ft)	325
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	12
Queuing Penalty (veh)	65

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	268	776	644	42	72	72	126	134	279	140	207	124
Average Queue (ft)	189	278	225	10	37	30	52	60	90	68	102	60
95th Queue (ft)	297	1137	1012	33	63	62	99	110	224	128	181	104
Link Distance (ft)		1873	1873	436	436	436		1199	1199	1199	223	223
Upstream Blk Time (%)		3	1						0		1	
Queuing Penalty (veh)		0	0						0		2	
Storage Bay Dist (ft)	180						250					
Storage Blk Time (%)	24	0										
Queuing Penalty (veh)	16	0										

Intersection: 4: B ST & WINTON PKWY

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	107	135
Average Queue (ft)	51	59
95th Queue (ft)	94	105
Link Distance (ft)	223	223
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	106	56	98	60
Average Queue (ft)	61	28	55	29
95th Queue (ft)	90	47	83	50
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	41	30
Average Queue (ft)	3	7
95th Queue (ft)	22	28
Link Distance (ft)	708	597
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	37	37
Average Queue (ft)	3	8
95th Queue (ft)	19	31
Link Distance (ft)	304	584
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	104	94	60	34
Average Queue (ft)	56	54	31	11
95th Queue (ft)	89	83	54	35
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: MAIN ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	401	199	365	100
Average Queue (ft)	140	71	110	33
95th Queue (ft)	339	154	293	78
Link Distance (ft)	922	810	1297	1094
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 1268

Intersection	
Intersection Delay, s/veh	92
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	292	1	5	630	243	0	0	139	275
Future Vol, veh/h	0	0	0	292	1	5	630	243	0	0	139	275
Peak Hour Factor	0.92	0.92	0.92	0.80	0.80	0.80	0.95	0.95	0.95	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	8	5	6	2	2	12	2
Mvmt Flow	0	0	0	365	1	6	663	256	0	0	167	331
Number of Lanes	0	0	0	0	1	0	1	1	0	0	1	0

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	27.8	147	38.5
HCM LOS	D	F	E

Lane	NBLn1	NBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	98%	0%
Vol Thru, %	0%	100%	0%	34%
Vol Right, %	0%	0%	2%	66%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	630	243	298	414
LT Vol	630	0	292	0
Through Vol	0	243	1	139
RT Vol	0	0	5	275
Lane Flow Rate	663	256	372	499
Geometry Grp	7	7	2	5
Degree of Util (X)	1.362	0.49	0.727	0.866
Departure Headway (Hd)	7.394	6.9	7.433	6.602
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	491	519	492	554
Service Time	5.166	4.672	5.433	4.602
HCM Lane V/C Ratio	1.35	0.493	0.756	0.901
HCM Control Delay	197.5	16.2	27.8	38.5
HCM Lane LOS	F	C	D	E
HCM 95th-tile Q	30	2.7	5.9	9.5

Intersection	
Intersection Delay, s/veh	192.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	1	652	0	0	0	0	749	447	15	410	0
Future Vol, veh/h	125	1	652	0	0	0	0	749	447	15	410	0
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.95	0.95	0.95	0.77	0.77	0.77
Heavy Vehicles, %	6	2	7	2	2	2	2	4	15	8	8	2
Mvmt Flow	129	1	672	0	0	0	0	788	471	19	532	0
Number of Lanes	0	1	1	0	0	0	0	1	1	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	156.7	236.9	143.8
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	99%	0%	100%	0%
Vol Thru, %	100%	0%	1%	0%	0%	100%
Vol Right, %	0%	100%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	749	447	126	652	15	410
LT Vol	0	0	125	0	15	0
Through Vol	749	0	1	0	0	410
RT Vol	0	447	0	652	0	0
Lane Flow Rate	788	471	130	672	19	532
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.692	0.943	0.302	1.328	0.047	1.221
Departure Headway (Hd)	8.828	8.29	8.902	7.591	9.782	9.26
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	418	442	407	484	368	399
Service Time	6.528	5.99	6.602	5.291	7.482	6.96
HCM Lane V/C Ratio	1.885	1.066	0.319	1.388	0.052	1.333
HCM Control Delay	343.2	58.8	15.4	184	13	148.6
HCM Lane LOS	F	F	C	F	B	F
HCM 95th-tile Q	41.5	10.9	1.3	27.9	0.1	19.8

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	286	18	78	43	282	100	913	198	885
v/c Ratio	0.91	0.03	0.13	0.35	0.65	0.66	0.88	0.89	0.71
Control Delay	67.6	21.9	0.7	48.8	14.1	62.1	40.4	76.9	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	21.9	0.7	48.8	14.1	62.1	40.4	76.9	27.5
Queue Length 50th (ft)	137	7	0	21	18	49	217	97	191
Queue Length 95th (ft)	#357	21	0	65	88	#155	#414	#300	#366
Internal Link Dist (ft)		683			694		293		429
Turn Bay Length (ft)	315		150	300		250		210	
Base Capacity (vph)	326	641	620	127	499	155	1065	223	1248
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	0.88	0.03	0.13	0.34	0.57	0.65	0.86	0.89	0.71

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)	243	15	66	40	10	255	87	702	92	194	700	168
Future Volume (veh/h)	243	15	66	40	10	255	87	702	92	194	700	168
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	1663	1870	1826	1663	1870	1856	1856	1870	1870	1737	1781	1856
Adj Flow Rate, veh/h	286	18	78	43	11	271	100	807	106	198	714	171
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.87	0.87	0.87	0.98	0.98	0.98
Percent Heavy Veh, %	16	2	5	16	2	3	3	2	2	11	8	3
Cap, veh/h	318	591	489	72	10	246	127	891	117	226	939	225
Arrive On Green	0.20	0.32	0.32	0.05	0.16	0.16	0.07	0.28	0.28	0.14	0.35	0.35
Sat Flow, veh/h	1584	1870	1547	1584	62	1532	1767	3158	415	1654	2709	648
Grp Volume(v), veh/h	286	18	78	43	0	282	100	454	459	198	446	439
Grp Sat Flow(s),veh/h/ln	1584	1870	1547	1584	0	1595	1767	1777	1796	1654	1692	1665
Q Serve(g_s), s	14.7	0.6	3.0	2.2	0.0	13.4	4.7	20.6	20.6	9.8	19.5	19.5
Cycle Q Clear(g_c), s	14.7	0.6	3.0	2.2	0.0	13.4	4.7	20.6	20.6	9.8	19.5	19.5
Prop In Lane	1.00		1.00	1.00		0.96	1.00		0.23	1.00		0.39
Lane Grp Cap(c), veh/h	318	591	489	72	0	256	127	501	507	226	587	577
V/C Ratio(X)	0.90	0.03	0.16	0.60	0.00	1.10	0.79	0.91	0.91	0.88	0.76	0.76
Avail Cap(c_a), veh/h	330	591	489	129	0	256	157	519	525	226	587	577
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.6	19.7	20.6	39.1	0.0	35.1	38.1	28.9	28.9	35.4	24.2	24.2
Incr Delay (d2), s/veh	25.7	0.0	0.2	7.8	0.0	86.5	18.9	19.1	19.0	29.8	5.8	5.9
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	7.7	0.2	1.1	1.0	0.0	11.2	2.6	10.8	10.9	5.6	8.1	8.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	19.8	20.7	46.9	0.0	121.6	57.0	48.0	47.9	65.2	30.0	30.1
LnGrp LOS	E	B	C	D	A	F	E	D	D	E	C	C
Approach Vol, veh/h		382			325			1013			1083	
Approach Delay, s/veh		48.8			111.7			48.8			36.5	
Approach LOS		D			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	28.2	8.4	31.0	10.6	33.6	21.4	18.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	11.4	24.4	6.8	19.0	7.4	28.4	17.4	13.4
Max Q Clear Time (g_c+I1), s	11.8	22.6	4.2	5.0	6.7	21.5	16.7	15.4
Green Ext Time (p_c), s	0.0	1.0	0.0	0.2	0.0	3.0	0.1	0.0

Intersection Summary			
HCM 6th Ctrl Delay			51.3
HCM 6th LOS			D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	455	257	12	130	215	88	315	181	277	313
v/c Ratio	0.83	0.15	0.10	0.25	0.51	0.44	0.46	0.94	0.34	0.52
Control Delay	44.6	7.5	53.0	34.4	9.7	50.2	32.9	93.8	32.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	7.5	53.0	34.4	9.7	50.2	32.9	93.8	32.9	7.8
Queue Length 50th (ft)	183	16	5	29	0	38	67	84	61	0
Queue Length 95th (ft)	#651	58	34	73	60	140	164	#404	153	76
Internal Link Dist (ft)		1856		434			1171		221	
Turn Bay Length (ft)	180				250					
Base Capacity (vph)	778	2011	115	746	503	276	1682	193	1525	860
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	0.58	0.13	0.10	0.17	0.43	0.32	0.19	0.94	0.18	0.36

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)	396	129	95	11	118	196	84	288	11	172	263	297
Future Volume (veh/h)	396	129	95	11	118	196	84	288	11	172	263	297
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	455	148	109	12	130	133	88	303	12	181	277	234
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	528	816	563	27	437	195	114	508	20	234	763	340
Arrive On Green	0.30	0.41	0.41	0.02	0.12	0.12	0.06	0.15	0.15	0.13	0.21	0.21
Sat Flow, veh/h	1781	2011	1387	1781	3554	1585	1781	3485	138	1781	3554	1585
Grp Volume(v), veh/h	455	130	127	12	130	133	88	154	161	181	277	234
Grp Sat Flow(s),veh/h/ln	1781	1777	1621	1781	1777	1585	1781	1777	1846	1781	1777	1585
Q Serve(g_s), s	14.6	2.8	3.1	0.4	2.0	4.9	2.9	4.9	4.9	6.0	4.0	8.2
Cycle Q Clear(g_c), s	14.6	2.8	3.1	0.4	2.0	4.9	2.9	4.9	4.9	6.0	4.0	8.2
Prop In Lane	1.00		0.86	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	528	721	658	27	437	195	114	259	269	234	763	340
V/C Ratio(X)	0.86	0.18	0.19	0.45	0.30	0.68	0.77	0.59	0.60	0.77	0.36	0.69
Avail Cap(c_a), veh/h	993	1231	1123	147	768	342	353	1067	1108	247	1922	857
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	20.2	11.5	11.6	29.6	24.2	25.5	27.9	24.2	24.2	25.4	20.3	21.9
Incr Delay (d2), s/veh	4.3	0.1	0.1	11.2	0.4	4.2	10.3	2.2	2.1	13.4	0.3	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	6.0	1.0	1.0	0.2	0.8	1.9	1.5	2.1	2.2	3.1	1.5	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	11.7	11.8	40.8	24.6	29.6	38.2	26.4	26.4	38.9	20.6	24.4
LnGrp LOS	C	B	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		712			275			403			692	
Approach Delay, s/veh		19.9			27.7			29.0			26.6	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	13.4	5.4	29.2	8.4	17.6	22.6	12.1
Change Period (Y+Rc), s	4.6	* 4.6	4.5	4.6	4.5	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	* 36	5.0	42.0	12.0	32.8	33.8	13.1
Max Q Clear Time (g_c+I1), s	8.0	6.9	2.4	5.1	4.9	10.2	16.6	6.9
Green Ext Time (p_c), s	0.0	1.9	0.0	1.6	0.1	2.4	1.3	0.6

Intersection Summary			
HCM 6th Ctrl Delay			24.9
HCM 6th LOS			C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	318	70	75	332	54	60
Future Vol, veh/h	318	70	75	332	54	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	388	85	84	373	61	67
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	13.7	16.3	10.4
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	47%	0%	0%	18%
Vol Thru, %	0%	100%	0%	82%
Vol Right, %	53%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	114	318	70	407
LT Vol	54	0	0	75
Through Vol	0	318	0	332
RT Vol	60	0	70	0
Lane Flow Rate	128	388	85	457
Geometry Grp	2	7	7	5
Degree of Util (X)	0.209	0.57	0.109	0.631
Departure Headway (Hd)	5.87	5.293	4.587	4.964
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	615	675	771	718
Service Time	3.87	3.084	2.377	3.05
HCM Lane V/C Ratio	0.208	0.575	0.11	0.636
HCM Control Delay	10.4	15	7.9	16.3
HCM Lane LOS	B	B	A	C
HCM 95th-tile Q	0.8	3.6	0.4	4.5

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	370	402	7	4	5
Future Vol, veh/h	8	370	402	7	4	5
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	82	82	89	89	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	451	452	8	4	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	460	0	-	0	927	456
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	471	-
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	1101	-	-	-	298	604
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1101	-	-	-	294	604
Mov Cap-2 Maneuver	-	-	-	-	294	-
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	628	-

Approach	EB		WB		SB	
HCM Control Delay, s	0.2		0		14	
HCM LOS					B	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1101	-	-	-	411
HCM Lane V/C Ratio	0.009	-	-	-	0.024
HCM Control Delay (s)	8.3	0	-	-	14
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	367	405	8	5	4
Future Vol, veh/h	7	367	405	8	5	4
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	73	73	90	90	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	503	450	9	5	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	459	0	-	0	978	455
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	523	-
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	1102	-	-	-	278	605
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1102	-	-	-	274	605
Mov Cap-2 Maneuver	-	-	-	-	274	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	595	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1102	-	-	-	362
HCM Lane V/C Ratio	0.009	-	-	-	0.027
HCM Control Delay (s)	8.3	0	-	-	15.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	342	46	20	374	8	45	2	20	7	1	5
Future Vol, veh/h	6	342	46	20	374	8	45	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	468	63	22	416	9	56	3	25	13	2	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	18.3	15.1	10.3	9.6
HCM LOS	C	C	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	2%	5%	54%
Vol Thru, %	3%	87%	93%	8%
Vol Right, %	30%	12%	2%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	67	394	402	13
LT Vol	45	6	20	7
Through Vol	2	342	374	1
RT Vol	20	46	8	5
Lane Flow Rate	84	540	447	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.145	0.704	0.602	0.042
Departure Headway (Hd)	6.23	4.699	4.852	6.333
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	579	761	737	568
Service Time	4.232	2.783	2.942	4.338
HCM Lane V/C Ratio	0.145	0.71	0.607	0.042
HCM Control Delay	10.3	18.3	15.1	9.6
HCM Lane LOS	B	C	C	A
HCM 95th-tile Q	0.5	5.9	4.1	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.1	2.1	0.5
Total Del/Veh (s)	58.6	22.2	16.8	29.5

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	1.7	0.0	0.0	0.6
Total Del/Veh (s)	24.2	7.4	4.9	12.5

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.4	1.0	0.0	0.1	0.6
Total Del/Veh (s)	28.6	26.1	15.7	18.9	20.1

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.0	0.0	0.5	0.0	0.4
Total Del/Veh (s)	26.3	14.7	21.1	15.3	19.6

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	13.1	8.4	6.0	10.3

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	3.3	0.2	12.6	2.4

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	4.5	0.0	0.1	3.0
Total Del/Veh (s)	7.6	2.5	62.2	6.9

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.1	0.1	0.2	0.1	0.7
Total Del/Veh (s)	17.3	8.0	5.7	4.4	13.1

Total Zone Performance

Denied Del/Veh (s)	2.2
Total Del/Veh (s)	542.4

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	L	T	T	R
Maximum Queue (ft)	555	269	505	189	122
Average Queue (ft)	221	182	138	68	58
95th Queue (ft)	471	290	368	142	114
Link Distance (ft)	1422		631	1051	
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			1		
Storage Bay Dist (ft)		180			100
Storage Blk Time (%)		14	1	3	1
Queuing Penalty (veh)		51	3	5	1

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	322	410	276	103	39	96
Average Queue (ft)	110	192	100	38	3	28
95th Queue (ft)	225	360	214	77	20	81
Link Distance (ft)	1860		448	448		631
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		500			215	
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	0	1				

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	279	113	63	162	271	109	199	199	234	287	276
Average Queue (ft)	120	21	25	51	110	38	97	90	107	105	148
95th Queue (ft)	224	58	50	127	238	89	177	171	193	223	245
Link Distance (ft)		705			722		300	300		448	
Upstream Blk Time (%)										0	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)	315		150	300		250			210		210
Storage Blk Time (%)	0			0	1		0		2	0	2
Queuing Penalty (veh)	0			0	1		0		12	2	10

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	254	261	164	44	55	53	79	111	148	139	215	161
Average Queue (ft)	132	70	42	11	26	17	39	41	69	62	92	59
95th Queue (ft)	222	172	110	33	50	44	65	84	126	113	168	118
Link Distance (ft)		1873	1873	436	436	436			1671	1671	223	223
Upstream Blk Time (%)											0	0
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	180						250	100				
Storage Blk Time (%)	5	0						1	4			
Queuing Penalty (veh)	6	0						2	2			

Intersection: 4: B ST & WINTON PKWY

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	132	121
Average Queue (ft)	41	53
95th Queue (ft)	98	98
Link Distance (ft)	223	223
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	234	62	91	96
Average Queue (ft)	97	24	49	38
95th Queue (ft)	180	50	79	73
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	31	46
Average Queue (ft)	2	14
95th Queue (ft)	19	40
Link Distance (ft)	708	597
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	250	78
Average Queue (ft)	44	18
95th Queue (ft)	185	57
Link Distance (ft)	304	584
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	235	113	88	31
Average Queue (ft)	106	46	37	9
95th Queue (ft)	233	83	65	32
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	13			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 112

Intersection	
Intersection Delay, s/veh	27.4
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	405	47	55	232	60	110
Future Vol, veh/h	405	47	55	232	60	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	540	63	86	363	97	177
Number of Lanes	1	1	1	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	40.2	17.8	14.9
HCM LOS	E	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	35%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%
Vol Right, %	65%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	170	405	47	55	232
LT Vol	60	0	0	55	0
Through Vol	0	405	0	0	232
RT Vol	110	0	47	0	0
Lane Flow Rate	274	540	63	86	362
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.475	0.916	0.094	0.162	0.633
Departure Headway (Hd)	6.232	6.104	5.392	6.797	6.287
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	576	594	661	525	573
Service Time	4.309	3.868	3.156	4.571	4.06
HCM Lane V/C Ratio	0.476	0.909	0.095	0.164	0.632
HCM Control Delay	14.9	43.8	8.7	10.9	19.4
HCM Lane LOS	B	E	A	B	C
HCM 95th-tile Q	2.5	11.4	0.3	0.6	4.4

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	513	279	2	7	8
Future Vol, veh/h	2	513	279	2	7	8
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	75	75	64	64	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	684	436	3	8	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	439	0	-	0	1128	438
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	690	-
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	1121	-	-	-	226	619
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	498	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1121	-	-	-	225	619
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	648	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1121	-	-	-	341
HCM Lane V/C Ratio	0.002	-	-	-	0.048
HCM Control Delay (s)	8.2	0	-	-	16.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	518	275	3	9	6
Future Vol, veh/h	2	518	275	3	9	6
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	56	56	55	55	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	925	500	5	10	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	505	0	-	0	1436	503
Stage 1	-	-	-	-	503	-
Stage 2	-	-	-	-	933	-
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	1060	-	-	-	147	569
Stage 1	-	-	-	-	607	-
Stage 2	-	-	-	-	383	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1060	-	-	-	146	569
Mov Cap-2 Maneuver	-	-	-	-	146	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	23.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1060	-	-	-	208
HCM Lane V/C Ratio	0.003	-	-	-	0.078
HCM Control Delay (s)	8.4	0	-	-	23.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Intersection Delay, s/veh	113.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	444	83	25	228	4	60	1	40	3	4	5
Future Vol, veh/h	1	444	83	25	228	4	60	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	793	148	45	415	7	85	1	56	5	7	8
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	177	19.3	12.8	11.1
HCM LOS	F	C	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	59%	0%	100%	0%	25%
Vol Thru, %	1%	84%	0%	98%	33%
Vol Right, %	40%	16%	0%	2%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	528	25	232	12
LT Vol	60	1	25	0	3
Through Vol	1	444	0	228	4
RT Vol	40	83	0	4	5
Lane Flow Rate	142	943	45	422	20
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.259	1.334	0.079	0.67	0.039
Departure Headway (Hd)	7.246	5.093	6.639	6.117	7.739
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	499	707	543	595	465
Service Time	5.246	3.192	4.339	3.817	5.739
HCM Lane V/C Ratio	0.285	1.334	0.083	0.709	0.043
HCM Control Delay	12.8	177	9.9	20.3	11.1
HCM Lane LOS	B	F	A	C	B
HCM 95th-tile Q	1	38.1	0.3	5	0.1

1: SR 99 NORTH RAMP & WINTON PKWY Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.1	2.7	0.8
Total Del/Veh (s)	39.5	30.2	24.9	30.5

2: WINTON PKWY & SR 99 SOUTH RAMP Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	2.4	0.1	0.0	0.8
Total Del/Veh (s)	85.7	13.7	7.5	36.0

3: WINTON PKWY & JOSEPH GALLO CT Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	3.6	0.8	0.1	0.1	0.6
Total Del/Veh (s)	41.8	32.1	21.2	22.3	25.4

4: B ST & WINTON PKWY Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	1.2	0.0	0.8	0.0	0.5
Total Del/Veh (s)	36.3	19.9	29.7	21.1	26.9

5: BRIARWOOD DR & B ST Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0
Total Del/Veh (s)	10.5	8.5	4.7	8.9

6: B ST & WEST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	3.0	0.2	4.9	1.6

7: B ST & EAST PROJECT ACCESS Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.9	2.8	8.4	1.9

8: PRUSSO ST & B ST Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.1	0.1	0.0
Total Del/Veh (s)	8.7	9.7	5.2	4.6	8.8

Total Zone Performance

Denied Del/Veh (s)	1.7
Total Del/Veh (s)	762.2

Intersection: 1: SR 99 NORTH RAMP & WINTON PKWY

Movement	WB	NB	NB	SB	SB
Directions Served	LTR	L	T	T	R
Maximum Queue (ft)	319	270	655	238	205
Average Queue (ft)	173	220	252	93	108
95th Queue (ft)	284	321	644	191	192
Link Distance (ft)	1253		651	1055	
Upstream Blk Time (%)			1		
Queuing Penalty (veh)			7		
Storage Bay Dist (ft)		180			200
Storage Blk Time (%)		25	0	0	1
Queuing Penalty (veh)		61	1	1	1

Intersection: 2: WINTON PKWY & SR 99 SOUTH RAMP

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	T	R	L	T
Maximum Queue (ft)	1006	613	432	277	58	161
Average Queue (ft)	472	472	231	74	13	36
95th Queue (ft)	1232	732	408	169	42	113
Link Distance (ft)	1545		428	428		651
Upstream Blk Time (%)			1	0		
Queuing Penalty (veh)			6	0		
Storage Bay Dist (ft)		500			215	
Storage Blk Time (%)	2	38				0
Queuing Penalty (veh)	14	49				0

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	EB	EB	EB	WB	WB	NB	NB	NB	B26	B26	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	T	T	L	T
Maximum Queue (ft)	328	299	68	185	333	261	333	293	46	13	277	315
Average Queue (ft)	181	34	26	44	126	76	150	120	2	1	149	133
95th Queue (ft)	313	191	54	126	260	183	298	258	32	12	252	264
Link Distance (ft)		705			722		300	300	103	103		428
Upstream Blk Time (%)						0	1	0	0	0		0
Queuing Penalty (veh)						0	6	2	1	0		2
Storage Bay Dist (ft)	315		150	300		250					210	
Storage Blk Time (%)	3				2	0	3				4	1
Queuing Penalty (veh)	3				1	0	3				31	6

Intersection: 3: WINTON PKWY & JOSEPH GALLO CT

Movement	SB
Directions Served	TR
Maximum Queue (ft)	307
Average Queue (ft)	166
95th Queue (ft)	272
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	210
Storage Blk Time (%)	3
Queuing Penalty (veh)	15

Intersection: 4: B ST & WINTON PKWY

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	270	526	436	41	88	79	109	124	202	166	240	210
Average Queue (ft)	204	130	64	9	44	37	48	60	92	70	119	82
95th Queue (ft)	297	407	226	31	75	72	81	117	170	133	210	166
Link Distance (ft)		1873	1873	436	436	436			1199	1199	223	223
Upstream Blk Time (%)											2	0
Queuing Penalty (veh)											5	1
Storage Bay Dist (ft)	180						250	100				
Storage Blk Time (%)	20	0						5	9			
Queuing Penalty (veh)	13	0						7	8			

Intersection: 4: B ST & WINTON PKWY

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	179	165
Average Queue (ft)	62	62
95th Queue (ft)	138	123
Link Distance (ft)	223	223
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: BRIARWOOD DR & B ST

Movement	EB	EB	WB	NB
Directions Served	T	R	LT	LR
Maximum Queue (ft)	185	61	100	68
Average Queue (ft)	79	29	55	29
95th Queue (ft)	141	52	83	51
Link Distance (ft)	758	758	708	1311
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: B ST & WEST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	42	30
Average Queue (ft)	4	8
95th Queue (ft)	22	29
Link Distance (ft)	708	597
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: B ST & EAST PROJECT ACCESS

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	40	31
Average Queue (ft)	3	8
95th Queue (ft)	20	30
Link Distance (ft)	304	584
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: PRUSSO ST & B ST

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	149	97	63	39
Average Queue (ft)	64	55	31	12
95th Queue (ft)	111	84	55	37
Link Distance (ft)	231	922	1400	781
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 243

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	318	70	75	332	54	60
Future Vol, veh/h	318	70	75	332	54	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	388	85	84	373	61	67
Number of Lanes	1	1	1	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14	13.8	10.4
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	47%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%
Vol Right, %	53%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	114	318	70	75	332
LT Vol	54	0	0	75	0
Through Vol	0	318	0	0	332
RT Vol	60	0	70	0	0
Lane Flow Rate	128	388	85	84	373
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.208	0.576	0.11	0.137	0.553
Departure Headway (Hd)	5.839	5.349	4.643	5.844	5.34
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	619	667	761	608	668
Service Time	3.839	3.142	2.436	3.641	3.136
HCM Lane V/C Ratio	0.207	0.582	0.112	0.138	0.558
HCM Control Delay	10.4	15.3	8	9.6	14.7
HCM Lane LOS	B	C	A	A	B
HCM 95th-tile Q	0.8	3.7	0.4	0.5	3.4

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	370	402	7	4	5
Future Vol, veh/h	8	370	402	7	4	5
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	82	82	89	89	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	451	452	8	4	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	460	0	-	0	927	456
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	471	-
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	1101	-	-	-	298	604
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1101	-	-	-	294	604
Mov Cap-2 Maneuver	-	-	-	-	294	-
Stage 1	-	-	-	-	630	-
Stage 2	-	-	-	-	628	-

Approach	EB		WB		SB	
HCM Control Delay, s	0.2		0		14	
HCM LOS					B	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1101	-	-	-	411
HCM Lane V/C Ratio	0.009	-	-	-	0.024
HCM Control Delay (s)	8.3	0	-	-	14
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	367	405	8	5	4
Future Vol, veh/h	7	367	405	8	5	4
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	73	73	90	90	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	503	450	9	5	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	459	0	-	0	978	455
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	523	-
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	1102	-	-	-	278	605
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1102	-	-	-	274	605
Mov Cap-2 Maneuver	-	-	-	-	274	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	595	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1102	-	-	-	362
HCM Lane V/C Ratio	0.009	-	-	-	0.027
HCM Control Delay (s)	8.3	0	-	-	15.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	17.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	342	46	20	374	8	45	2	20	7	1	5
Future Vol, veh/h	6	342	46	20	374	8	45	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	468	63	22	416	9	56	3	25	13	2	9
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	19.7	16.2	10.4	9.7
HCM LOS	C	C	B	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	67%	2%	100%	0%	54%
Vol Thru, %	3%	87%	0%	98%	8%
Vol Right, %	30%	12%	0%	2%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	67	394	20	382	13
LT Vol	45	6	20	0	7
Through Vol	2	342	0	374	1
RT Vol	20	46	0	8	5
Lane Flow Rate	84	540	22	424	24
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.147	0.724	0.036	0.623	0.043
Departure Headway (Hd)	6.304	4.831	5.806	5.286	6.415
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	572	739	610	675	561
Service Time	4.306	2.918	3.602	3.082	4.422
HCM Lane V/C Ratio	0.147	0.731	0.036	0.628	0.043
HCM Control Delay	10.4	19.7	8.8	16.6	9.7
HCM Lane LOS	B	C	A	C	A
HCM 95th-tile Q	0.5	6.3	0.1	4.4	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	181	44	10	190	135	26	260	10	129	241	215
Future Volume (veh/h)	180	181	44	10	190	135	26	260	10	129	241	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	209	210	51	12	235	74	32	321	12	159	298	172
Peak Hour Factor	0.86	0.86	0.86	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	279	787	187	28	474	211	65	603	22	236	953	425
Arrive On Green	0.16	0.28	0.28	0.02	0.13	0.13	0.04	0.17	0.17	0.13	0.27	0.27
Sat Flow, veh/h	1781	2849	677	1781	3554	1585	1781	3494	130	1781	3554	1585
Grp Volume(v), veh/h	209	129	132	12	235	74	32	163	170	159	298	172
Grp Sat Flow(s),veh/h/ln	1781	1777	1749	1781	1777	1585	1781	1777	1847	1781	1777	1585
Q Serve(g_s), s	5.1	2.6	2.7	0.3	2.8	1.9	0.8	3.8	3.8	3.9	3.0	4.0
Cycle Q Clear(g_c), s	5.1	2.6	2.7	0.3	2.8	1.9	0.8	3.8	3.8	3.9	3.0	4.0
Prop In Lane	1.00		0.39	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	279	491	483	28	474	211	65	307	319	236	953	425
V/C Ratio(X)	0.75	0.26	0.27	0.44	0.50	0.35	0.49	0.53	0.53	0.68	0.31	0.40
Avail Cap(c_a), veh/h	1174	1645	1619	196	1332	594	397	1422	1478	330	2710	1209
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	18.3	12.8	12.8	22.1	18.2	17.9	21.4	17.1	17.1	18.8	13.3	13.6
Incr Delay (d2), s/veh	4.0	0.3	0.3	10.5	0.8	1.0	5.6	1.4	1.4	3.4	0.2	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.9	0.9	0.2	1.0	0.7	0.4	1.5	1.5	1.5	1.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	13.1	13.1	32.6	19.1	18.9	27.1	18.5	18.5	22.1	13.4	14.2
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		470			321			365			629	
Approach Delay, s/veh		17.2			19.5			19.3			15.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	12.4	5.2	17.1	6.3	16.8	11.7	10.6
Change Period (Y+Rc), s	4.6	4.6	4.5	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	36.3	5.0	42.0	10.1	34.6	29.9	17.0
Max Q Clear Time (g_c+I1), s	5.9	5.8	2.3	4.7	2.8	6.0	7.1	4.8
Green Ext Time (p_c), s	0.1	2.0	0.0	1.5	0.0	2.4	0.6	1.3

Intersection Summary			
HCM 6th Ctrl Delay			17.6
HCM 6th LOS			B

Notes
User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	355	40	55	155	50	110
Future Vol, veh/h	355	40	55	155	50	110
Peak Hour Factor	0.75	0.75	0.64	0.64	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	473	53	86	242	81	177
Number of Lanes	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	22.6	14.5	12.8
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	31%	0%	0%	26%
Vol Thru, %	0%	100%	0%	74%
Vol Right, %	69%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	355	40	210
LT Vol	50	0	0	55
Through Vol	0	355	0	155
RT Vol	110	0	40	0
Lane Flow Rate	258	473	53	328
Geometry Grp	2	7	7	5
Degree of Util (X)	0.413	0.756	0.075	0.514
Departure Headway (Hd)	5.759	5.747	5.037	5.642
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	625	630	710	637
Service Time	3.811	3.485	2.775	3.687
HCM Lane V/C Ratio	0.413	0.751	0.075	0.515
HCM Control Delay	12.8	24.2	8.2	14.5
HCM Lane LOS	B	C	A	B
HCM 95th-tile Q	2	6.8	0.2	2.9

Intersection	
Intersection Delay, s/veh	57.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	1	390	75	25	170	4	50	1	40	3	4	5
Future Vol, veh/h	1	390	75	25	170	4	50	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	696	134	45	309	7	70	1	56	5	7	8
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	83.9	14.6	11.6	10.3
HCM LOS	F	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	55%	0%	13%	25%
Vol Thru, %	1%	84%	85%	33%
Vol Right, %	44%	16%	2%	42%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	466	199	12
LT Vol	50	1	25	3
Through Vol	1	390	170	4
RT Vol	40	75	4	5
Lane Flow Rate	128	832	362	20
Geometry Grp	1	1	1	1
Degree of Util (X)	0.225	1.099	0.531	0.037
Departure Headway (Hd)	6.647	4.756	5.505	6.994
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	543	757	659	515
Service Time	4.647	2.852	3.505	4.994
HCM Lane V/C Ratio	0.236	1.099	0.549	0.039
HCM Control Delay	11.6	83.9	14.6	10.3
HCM Lane LOS	B	F	B	B
HCM 95th-tile Q	0.9	22.7	3.1	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	41	39	9	38	183	28	217	10	104	232	134
Future Volume (veh/h)	235	41	39	9	38	183	28	217	10	104	232	134
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	270	47	45	10	42	119	29	228	11	109	244	62
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	352	575	485	23	454	202	60	471	23	235	842	376
Arrive On Green	0.20	0.31	0.31	0.01	0.13	0.13	0.03	0.14	0.14	0.13	0.24	0.24
Sat Flow, veh/h	1781	1827	1542	1781	3554	1585	1781	3452	166	1781	3554	1585
Grp Volume(v), veh/h	270	46	46	10	42	119	29	117	122	109	244	62
Grp Sat Flow(s),veh/h/ln	1781	1777	1593	1781	1777	1585	1781	1777	1841	1781	1777	1585
Q Serve(g_s), s	6.5	0.8	0.9	0.3	0.5	3.2	0.7	2.8	2.8	2.6	2.5	1.4
Cycle Q Clear(g_c), s	6.5	0.8	0.9	0.3	0.5	3.2	0.7	2.8	2.8	2.6	2.5	1.4
Prop In Lane	1.00		0.97	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	352	559	501	23	454	202	60	242	251	235	842	376
V/C Ratio(X)	0.77	0.08	0.09	0.43	0.09	0.59	0.48	0.48	0.49	0.46	0.29	0.17
Avail Cap(c_a), veh/h	1329	1648	1477	197	1028	458	472	1428	1479	330	2574	1148
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	17.2	10.9	11.0	22.2	17.4	18.6	21.5	18.1	18.1	18.2	14.2	13.7
Incr Delay (d2), s/veh	3.5	0.1	0.1	12.1	0.1	2.7	5.9	1.5	1.5	1.4	0.2	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	2.6	0.3	0.3	0.2	0.2	1.2	0.4	1.1	1.1	1.0	0.8	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	11.0	11.0	34.2	17.5	21.3	27.4	19.6	19.5	19.6	14.3	13.9
LnGrp LOS	C	B	B	C	B	C	C	B	B	B	B	B
Approach Vol, veh/h		362			171			268			415	
Approach Delay, s/veh		18.2			21.2			20.4			15.7	
Approach LOS		B			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	10.8	5.1	18.8	6.0	15.3	13.6	10.4
Change Period (Y+Rc), s	4.6	* 4.6	4.5	4.6	4.5	4.6	4.6	4.6
Max Green Setting (Gmax), s	8.4	* 36	5.0	42.0	12.0	32.8	33.8	13.1
Max Q Clear Time (g_c+I1), s	4.6	4.8	2.3	2.9	2.7	4.5	8.5	5.2
Green Ext Time (p_c), s	0.1	1.4	0.0	0.5	0.0	1.7	0.8	0.3

Intersection Summary	
HCM 6th Ctrl Delay	18.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

5: BRIARWOOD DR & B ST

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	55	75	215	40	60
Future Vol, veh/h	185	55	75	215	40	60
Peak Hour Factor	0.82	0.82	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	226	67	84	242	45	67
Number of Lanes	1	1	0	1	1	0

Approach	EB		WB		NB
Opposing Approach	WB		EB		
Opposing Lanes	1		2		0
Conflicting Approach Left			NB		EB
Conflicting Lanes Left	0		1		2
Conflicting Approach Right	NB				WB
Conflicting Lanes Right	1		0		1
HCM Control Delay	9.6		11.2		9
HCM LOS	A		B		A

Lane	NBLn1	EBLn1	EBLn2	WBLn1
Vol Left, %	40%	0%	0%	26%
Vol Thru, %	0%	100%	0%	74%
Vol Right, %	60%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	185	55	290
LT Vol	40	0	0	75
Through Vol	0	185	0	215
RT Vol	60	0	55	0
Lane Flow Rate	112	226	67	326
Geometry Grp	2	7	7	5
Degree of Util (X)	0.157	0.319	0.082	0.425
Departure Headway (Hd)	5.041	5.084	4.379	4.695
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	709	706	816	766
Service Time	3.093	2.823	2.118	2.732
HCM Lane V/C Ratio	0.158	0.32	0.082	0.426
HCM Control Delay	9	10.2	7.5	11.2
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.6	1.4	0.3	2.1

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	230	30	20	265	8	30	2	20	7	1	5
Future Vol, veh/h	6	230	30	20	265	8	30	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	315	41	22	294	9	38	3	25	13	2	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.2	10.8	9	8.7
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	58%	2%	7%	54%
Vol Thru, %	4%	86%	90%	8%
Vol Right, %	38%	11%	3%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	52	266	293	13
LT Vol	30	6	20	7
Through Vol	2	230	265	1
RT Vol	20	30	8	5
Lane Flow Rate	65	364	326	24
Geometry Grp	1	1	1	1
Degree of Util (X)	0.097	0.452	0.412	0.036
Departure Headway (Hd)	5.368	4.463	4.558	5.437
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	664	805	788	654
Service Time	3.432	2.497	2.594	3.509
HCM Lane V/C Ratio	0.098	0.452	0.414	0.037
HCM Control Delay	9	11.2	10.8	8.7
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.3	2.4	2	0.1

Intersection	
Intersection Delay, s/veh	20.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	444	83	25	228	4	60	1	40	3	4	5
Future Vol, veh/h	1	444	83	25	228	4	60	1	40	3	4	5
Peak Hour Factor	0.56	0.56	0.56	0.55	0.55	0.55	0.71	0.71	0.71	0.60	0.60	0.60
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	793	148	45	415	7	85	1	56	5	7	8
Number of Lanes	0	2	0	0	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	24.9	13.4	11.8	10.2
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	59%	0%	0%	18%	0%	25%
Vol Thru, %	1%	100%	73%	82%	97%	33%
Vol Right, %	40%	0%	27%	0%	3%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	223	305	139	118	12
LT Vol	60	1	0	25	0	3
Through Vol	1	222	222	114	114	4
RT Vol	40	0	83	0	4	5
Lane Flow Rate	142	398	545	253	215	20
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.258	0.633	0.836	0.445	0.371	0.038
Departure Headway (Hd)	6.523	5.721	5.526	6.345	6.229	6.894
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	551	633	654	566	577	518
Service Time	4.561	3.455	3.26	4.093	3.977	4.949
HCM Lane V/C Ratio	0.258	0.629	0.833	0.447	0.373	0.039
HCM Control Delay	11.8	17.8	30.1	14.1	12.6	10.2
HCM Lane LOS	B	C	D	B	B	B
HCM 95th-tile Q	1	4.5	9.1	2.3	1.7	0.1

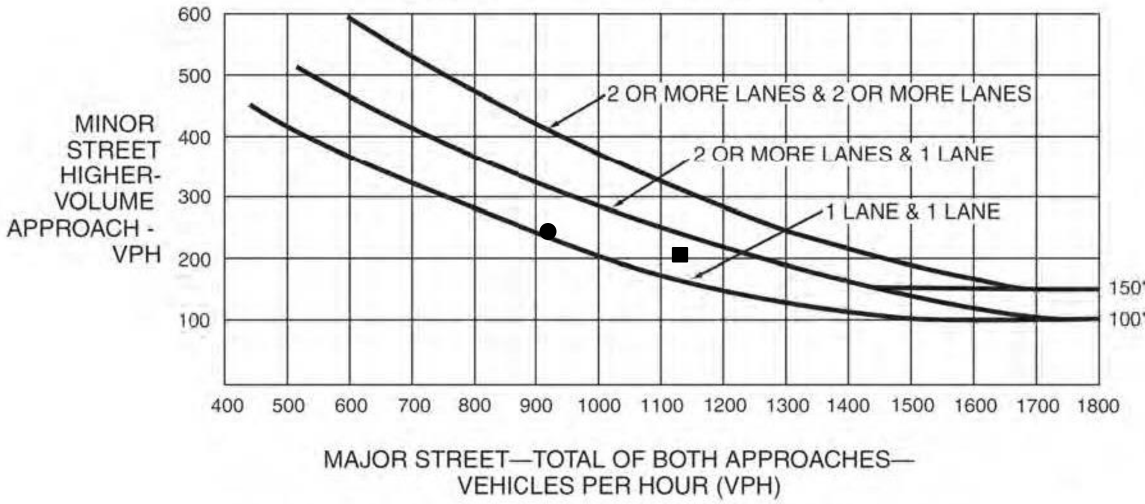
Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	342	46	20	374	8	45	2	20	7	1	5
Future Vol, veh/h	6	342	46	20	374	8	45	2	20	7	1	5
Peak Hour Factor	0.73	0.73	0.73	0.90	0.90	0.90	0.80	0.80	0.80	0.54	0.54	0.54
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	468	63	22	416	9	56	3	25	13	2	9
Number of Lanes	0	2	0	0	2	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	11.4	10.9	10	9.4
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	67%	3%	0%	10%	0%	54%
Vol Thru, %	3%	97%	79%	90%	96%	8%
Vol Right, %	30%	0%	21%	0%	4%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	67	177	217	207	195	13
LT Vol	45	6	0	20	0	7
Through Vol	2	171	171	187	187	1
RT Vol	20	0	46	0	8	5
Lane Flow Rate	84	242	297	230	217	24
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.14	0.357	0.424	0.346	0.322	0.041
Departure Headway (Hd)	6.012	5.306	5.14	5.422	5.345	6.099
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	600	672	693	658	665	590
Service Time	4.012	3.088	2.922	3.209	3.131	4.102
HCM Lane V/C Ratio	0.14	0.36	0.429	0.35	0.326	0.041
HCM Control Delay	10	11	11.7	11.1	10.7	9.4
HCM Lane LOS	A	B	B	B	B	A
HCM 95th-tile Q	0.5	1.6	2.1	1.5	1.4	0.1

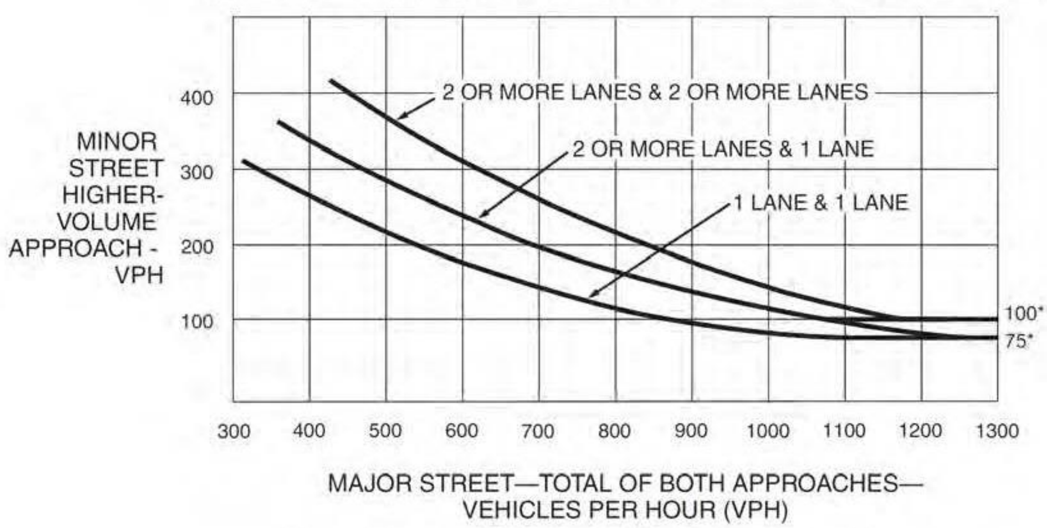
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

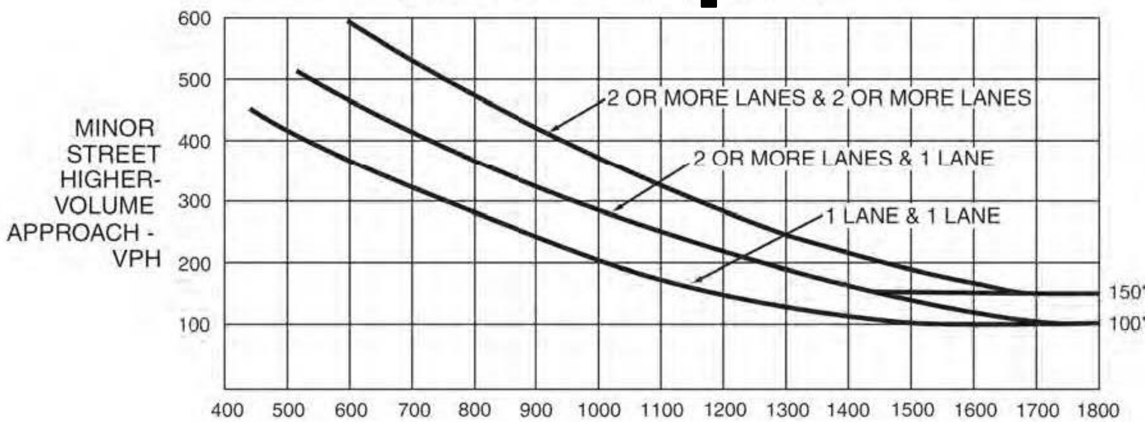


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

WINTON PKWY – SR 99 NB RAMPS : EXISTING

AM (●) : MAJOR 915 MINOR 240
PM (■) : MAJOR 1130 MINOR 201

Figure 4C-3. Warrant 3, Peak Hour

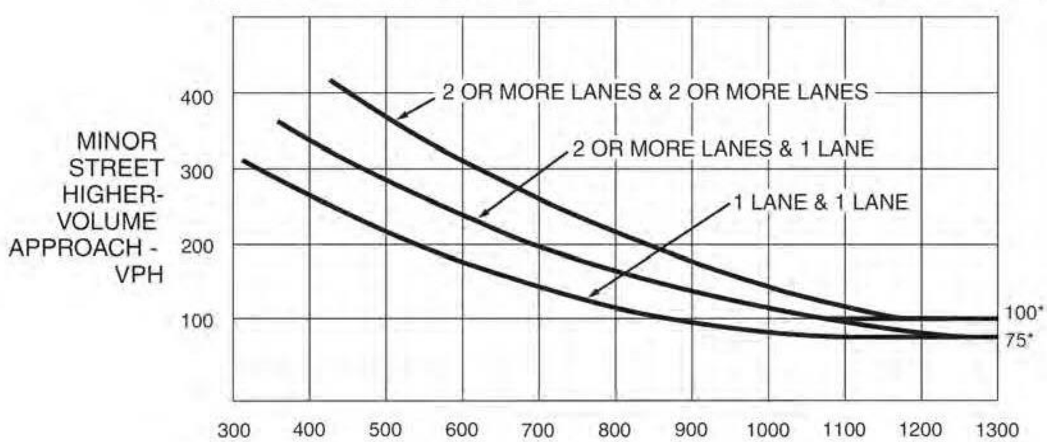


MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



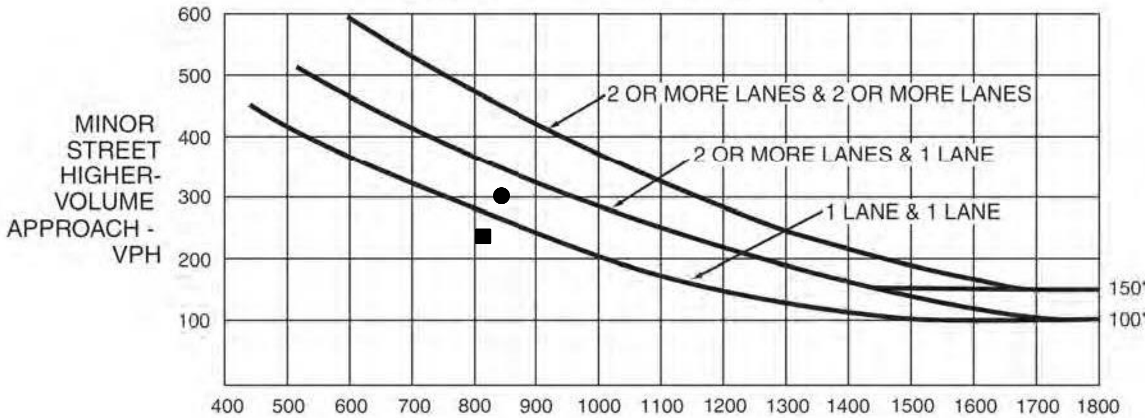
MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

WINTON PKWY – SR 99 SB RAMPS : EXISTING

AM (●) : MAJOR 1110 MINOR 650
PM (■) : MAJOR 1180 MINOR 626

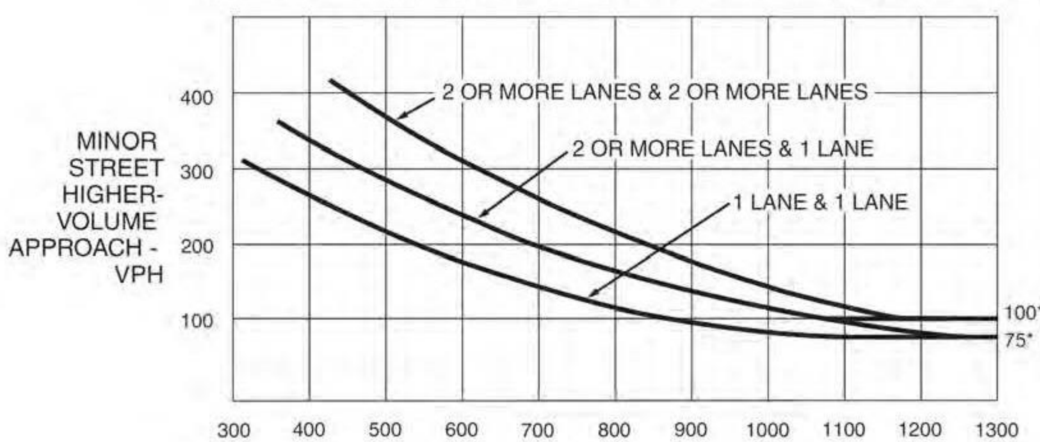
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

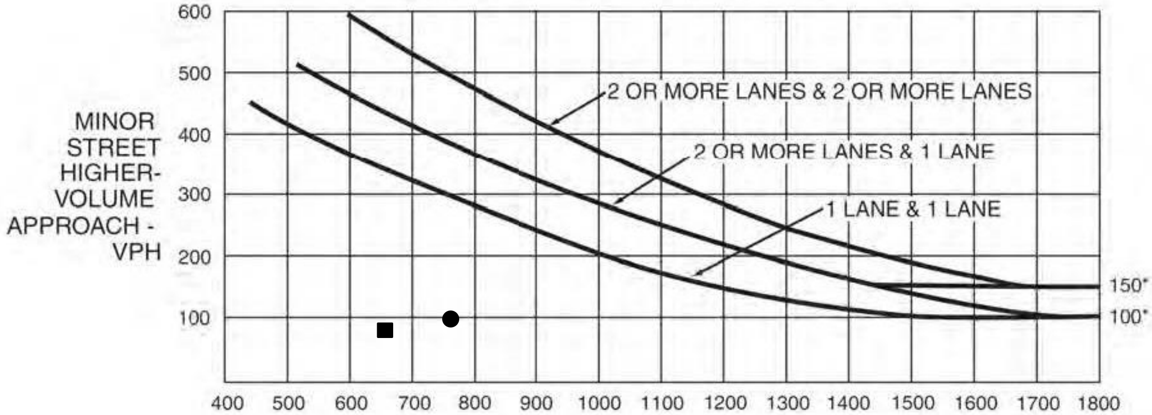


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

BRIARWOOD DR – B ST: EXISTING

AM (●) : MAJOR 840 MINOR 300
PM (■) : MAJOR 805 MINOR 225

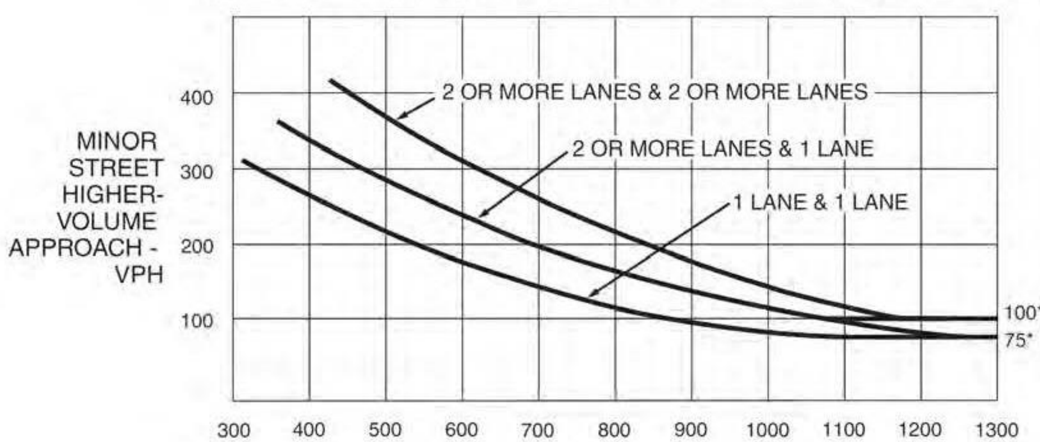
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

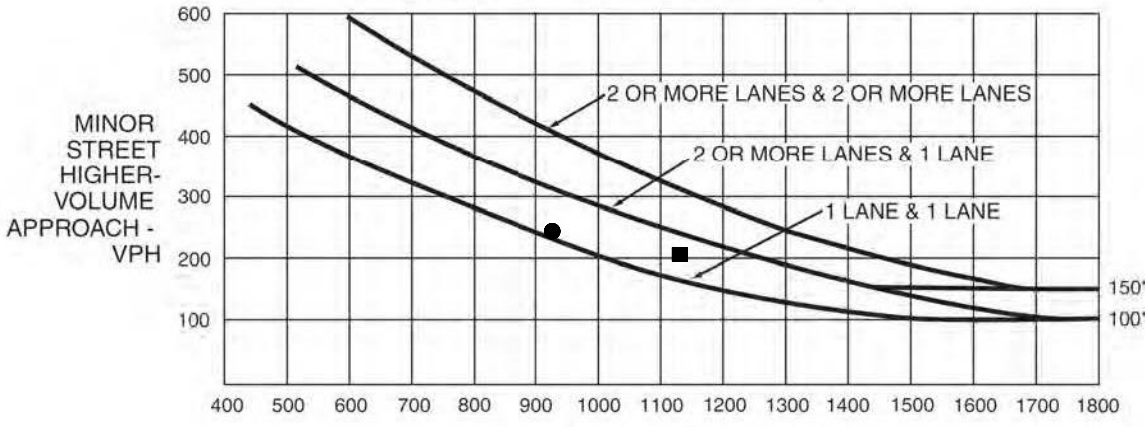


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

PRUSSO DR – B ST: EXISTING

AM (●) : MAJOR 775 MINOR 102
PM (■) : MAJOR 659 MINOR 91

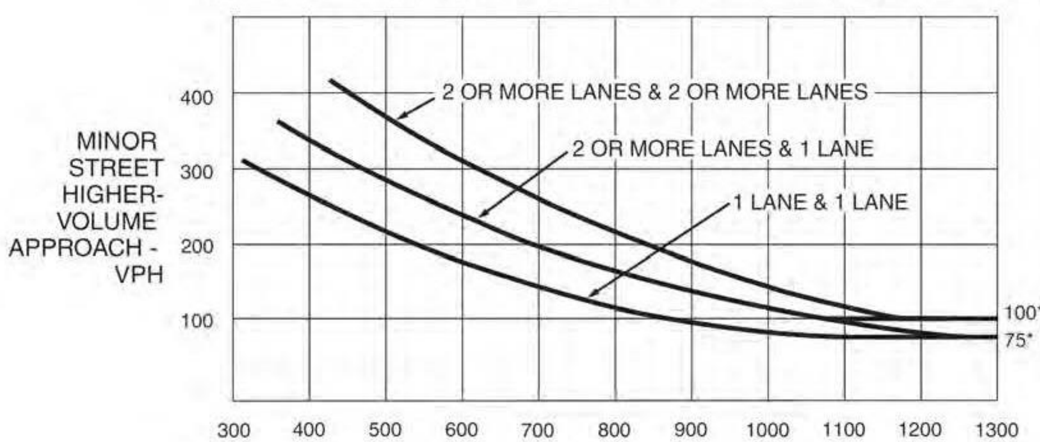
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

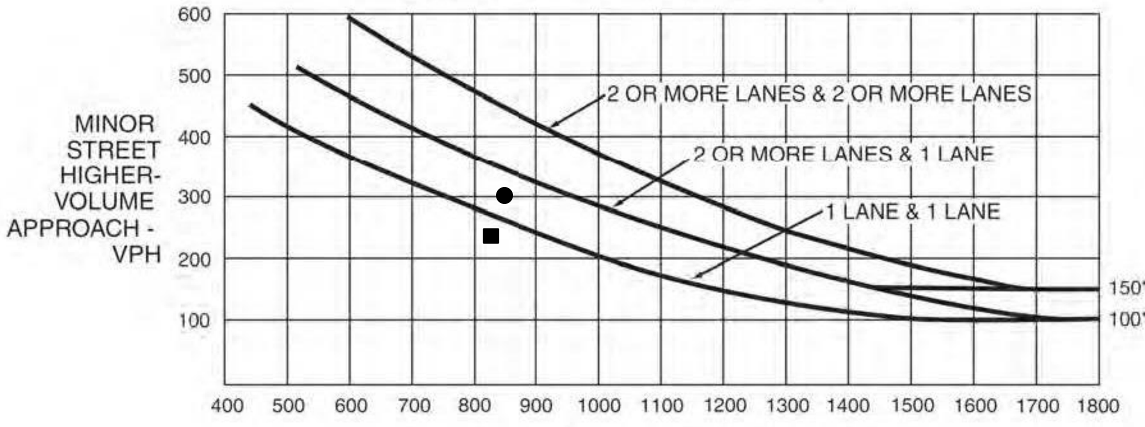


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

WINTON PKWY – SR 99 NB RAMPS : EXISTING PLUS PROJECT

AM (●) : MAJOR 920 MINOR 240
PM (■) : MAJOR 1134 MINOR 201

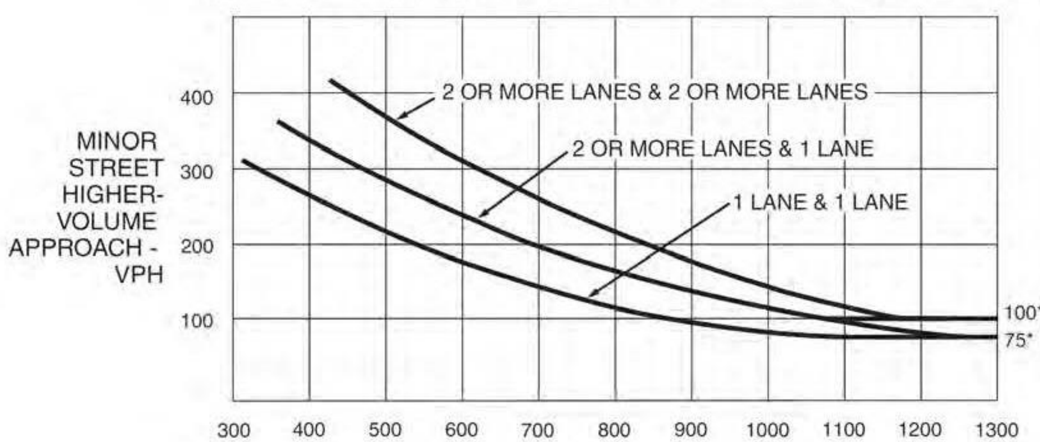
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

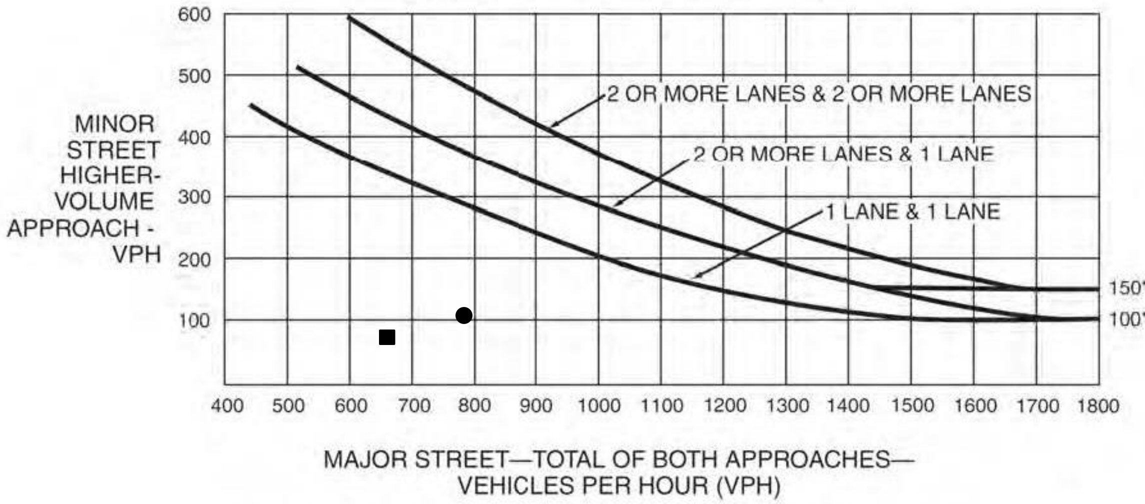


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

BRIARWOOD DR – B ST: EXISTING PLUS PROJECT

AM (●) : MAJOR 858 MINOR 300
PM (■) : MAJOR 829 MINOR 225

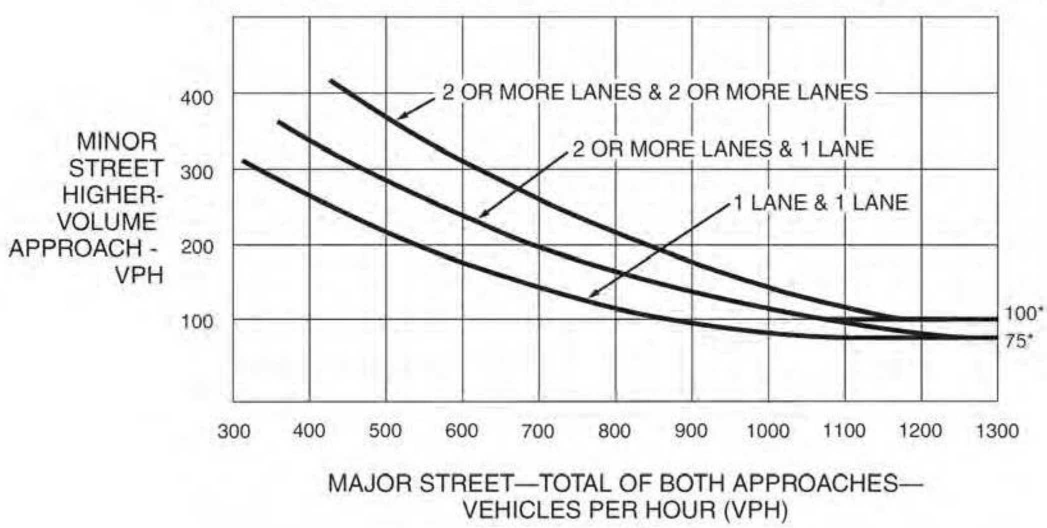
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

PRUSSO DR – B ST: EXISTING PLUS PROJECT

AM (●) : MAJOR 796 MINOR 103
PM (■) : MAJOR 682 MINOR 92